APPLICABLE TO

ALL SERIAL NUMBERS

MODEL CE-26A
SIGNAL GENERATOR

MAINTENANCE MANUAL

CUSHMAN
ELECTRONICS, INC.

MP MASTER
MA31787

CUSHMAN
ELECTRONICS, INC.

MANUAL CHANGE NOTICE

INSTRUMENT CE-26A MANUAL NO. 5601-0048 DATE PRINTED NO DATE

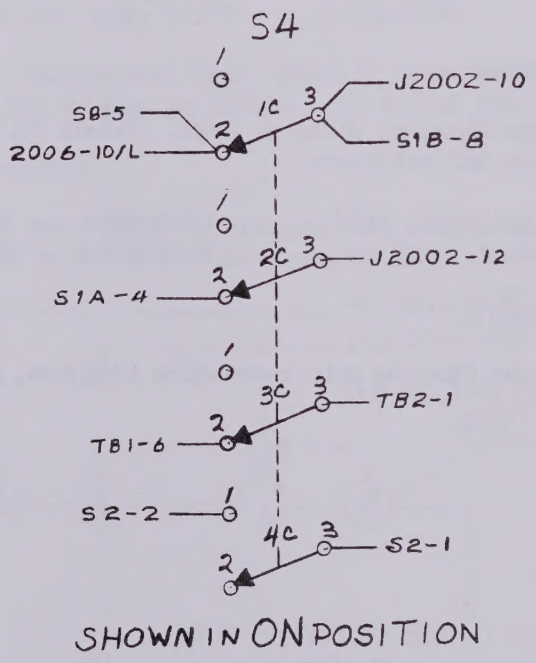
The following changes are necessary to bring your manual up to date. Changes are listed with the instrument serial numbers to which they apply. It is suggested that you enter these changes in your manual immediately.

All serial numbers.

Add the Table of Specifications to the Maintenance Manual. Table attached.

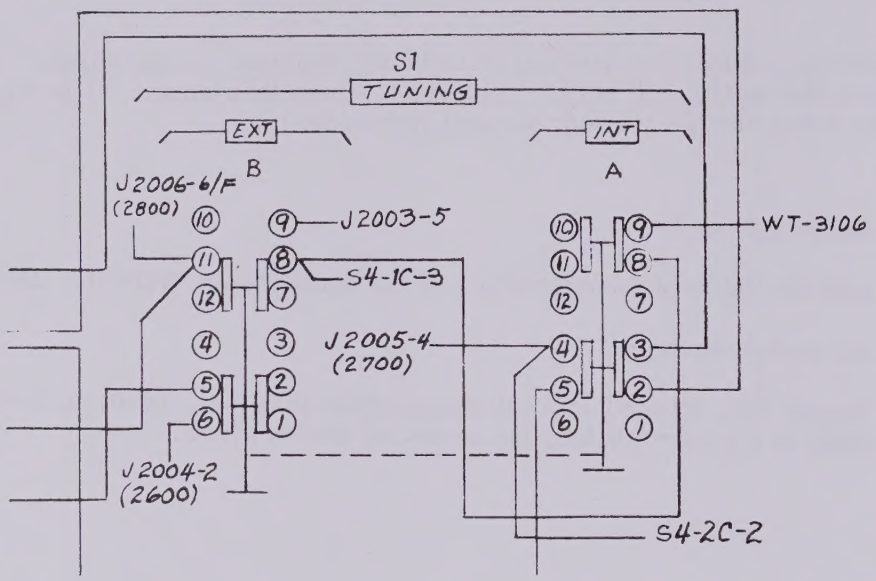
All serial numbers.

Figure 3-1, Front Panel Interconnection Diagram, 1000, p. 3-3, change S4 from a slide to a rotary switch, connected as shown below:



All serial numbers.

Figure 3-2, Front Panel Interconnection Diagram, 1000, p. 3-5, change the connections to S1 as shown below:



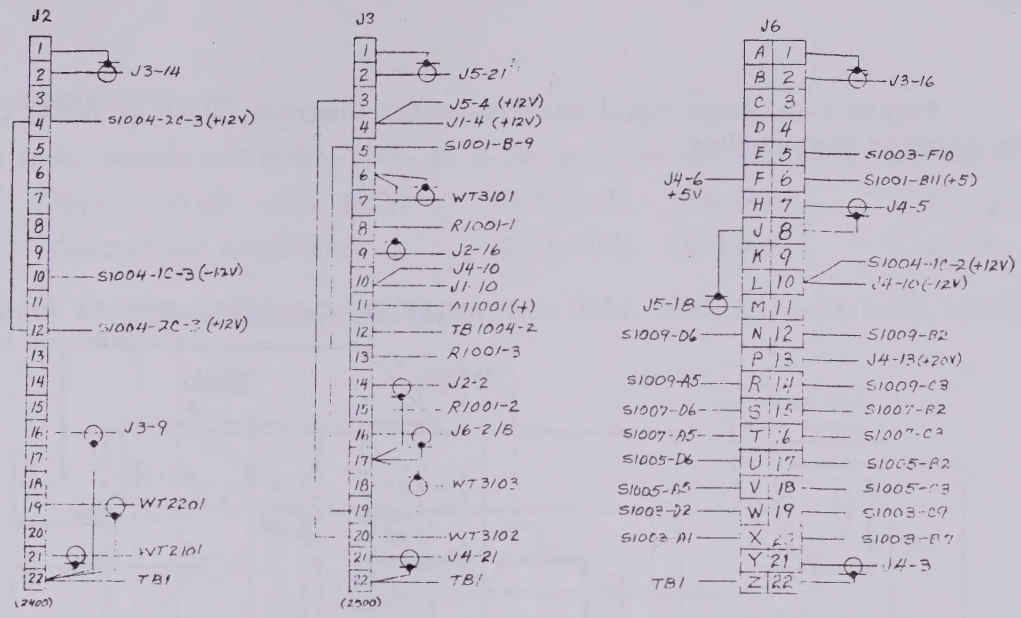
All serial numbers.

Parts list, Main Chassis, 2000, p. 3-11. Delete FL1, RF Line Filter. Add the following capacitors and inductors:

C1, C2	Cer, 2200pF, ±2%, 3KV	1005-0098	Erie	818Y5
L1, L2	Choke, 100μH, ±20%	1585-0040	Miller	B-6021

All serial numbers.

Figure 3-4, Main Chassis Interconnection Diagram, p. 3-13, change destinations as shown below:



Serial number 231-up.

Parts list, Sample and Hold, 2600, p. 3-39, 40, change Crystal and Resistors as follows:

Y1	Crystal, 11.919 MHz	2035-0021	Cushman	
R31	Comp, 820Ω, ±5%, 1/4W	1066-8215	AB	CB8215
R33	Comp, 1.8K, ±5%, 1/4W	1066-1825	AB	CB1825
R35	Comp, 3.9K, ±5%, 1/4W	1066-3925	AB	CB3925

Figure 3-10, Sample and Hold, sheet 2, 2600, Schematic Diagram, p. 3-43, change the value of R31 to 820, of R33 to 1.8K and of R35 to 3.9K.

All serial numbers.

Figure 3-14, Rear Panel Interconnection Diagram, 3000, p. 3-61, change destination on the RF Switch board as shown below:

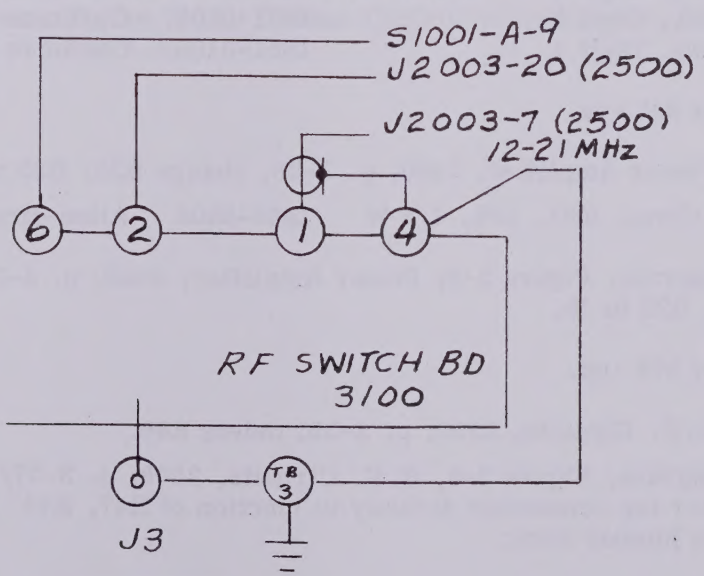
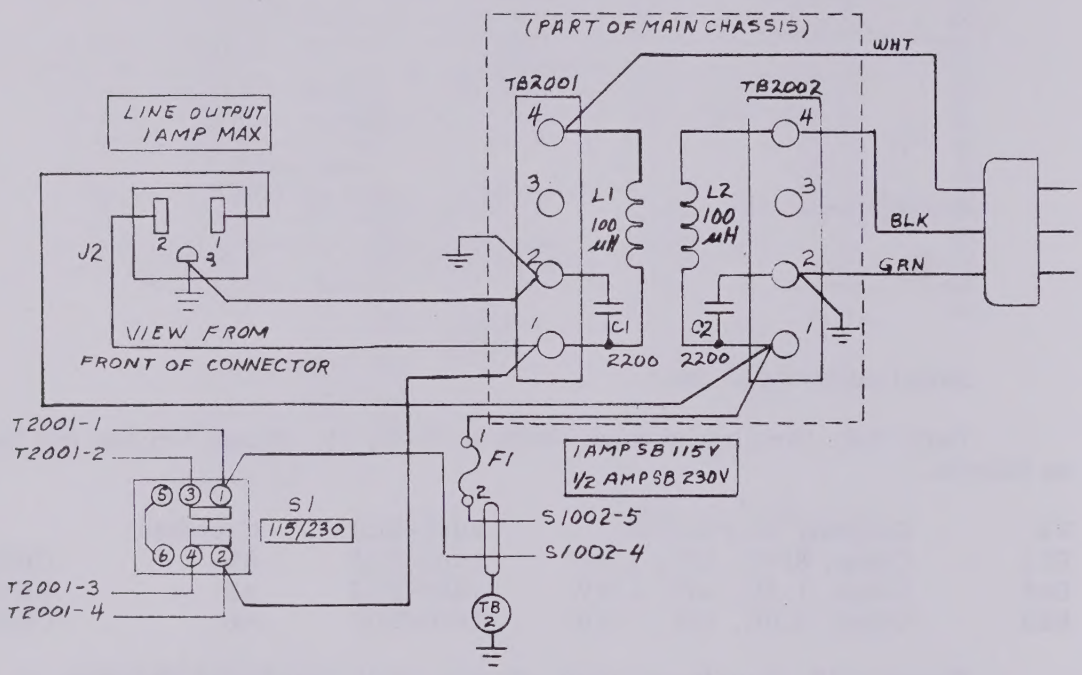


Figure 3-14, Rear Panel Interconnection Diagram, 3000, p. 3-61, change line filter as shown below:



Serial number 302 - up.

Parts List, Front Panel, 1000, p. 3-2, change S5, S7, and S9 as follows:

S5	Rotary, Digit 2	1851-0105	Cushman
S7	Rotary, Digit 3	1851-0105	Cushman
S9	Rotary, Digit 4	1851-0105	Cushman

Serial number 342 - up.

Parts List, Power Amplifier, 2400, p. 3-28, change R20, R23 as follows:

R20, R23	Comp, 39Ω, ±5%, 1/4 W	1066-3905	Allen-Bradley	CB3905

Schematic Diagram, Figure 3-8, Power Amplifier, 2400, p. 3-31/3-32, change the value of R20, R23 to 39.

Serial number 374 - up.

Parts List, R. F. Circuits, 2500, p. 3-35, delete R48.

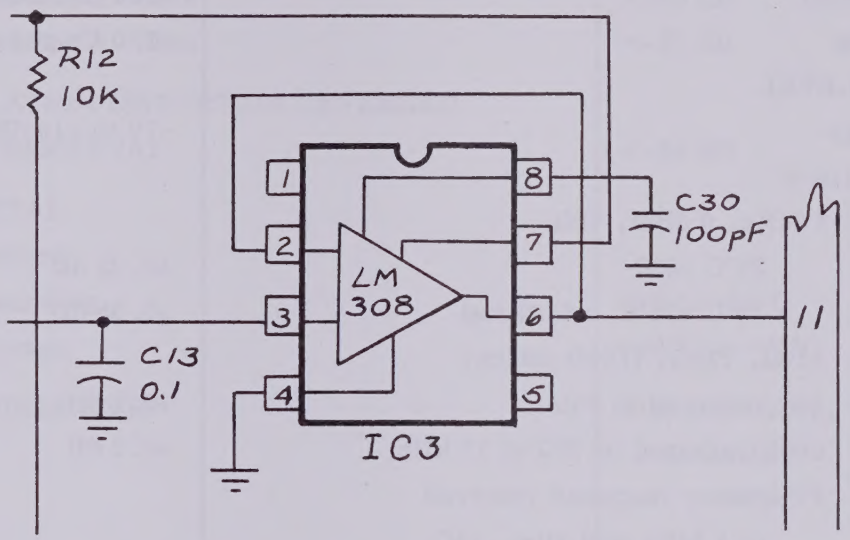
Schematic Diagram, Figure 3-9, R. F. Circuits, 2500, p. 3-37/3-38, delete R48 and make T4 center tap connection directly to junction of R47, R49. On component layout, show R48 as a jumper wire.

Serial number 386 - up.

Parts List, Sample and Hold, 2600, p. 3-39, add C30 and change IC3 as follows:

C30	Mica, 100 pF, ±5%, 500V	1002-0011	Elmenco	DM15-F-101J
IC3	Operational Amplifier	2025-0070	National	LM308N

Schematic Diagram, Figure 3-10, Sample and Hold, 2600, p. 3-41/3-42, change IC3 as shown below:



Serial number 362 - up.

Parts List, Voltage Controlled Oscillator, 2700, p. 3-47, change L7 as follows:

L7	Variable, 1.4 μH, ±5%	1596-0045	Dale	IDH1041-27

Schematic Diagram, Figure 3-12, Voltage Controlled Oscillator, 2700, p. 3-51/3-52, change the value of L7 to 1.4.

TABLE 1-1. Model CE-26A Specifications

FREQUENCY	
Range	4.0 kHz - 9.1 MHz
Digital Resolution	1 kHz
Continuous Fine Tuning Range	1.1 kHz
Fine Tuning Resolution	25 Hz
Stability	±300 Hz from 0°C to +50°C
Aging	±150 Hz per year
OUTPUT LEVEL	
Range	-70 to +10 dBm
Accuracy	
1 MHz, 0 dBm, 75Ω	
25°C ±5°C	±0.05 dB
25°C ±25°C, additional	±0.08 dB
124Ω, 135Ω, (150Ω option)	
referred to 75Ω	±0.1 dB
600Ω referred to 75Ω at 10 kHz	±0.2 dB
Frequency response referred	
to 1 MHz at 0 dBm, 75Ω	
4 kHz to 1 MHz	±0.25 dB
1 MHz to 9.1 MHz	±0.1 dB
124Ω, 135Ω, (150Ω option)	
referred to 75Ω	±0.05 dB
Frequency response referred to	
10 kHz, 0 dBm, 600Ω	
10 kHz to 350 kHz	±0.2 dB
4 kHz to 10 kHz and 350 kHz	
to 650 kHz, additional	±0.2 dB
Attenuator referred to 0 dBm	±0.1 dB
Resolution	
Meter linearity referred to 0 dBm	±0.02 dB
Meter range	±1.0 dB
Meter Resolution	±0.01 dB
Attenuator range	-69 to +9 dBm in 1 dB steps

TABLE 1-1. Model CE-26A Specifications (cont.)

OUTPUT IMPEDANCE	
Unbalanced	75Ω
Balanced	124, 135, 600Ω (150Ω-M1 option)
HARMONIC DISTORTION REFERRED	
TO FUNDAMENTAL	
Meter reading ≤0 dBm	<-40 dB
Meter reading >0 dBm	<-37 dB
INTERMODULATION DISTORTION REFERRED	
TO FUNDAMENTAL	<-50 dB
ENVIRONMENTAL	
Temperature	
Operating	0°C to +55°C
Storage	-40°C to +75°C
POWER REQUIREMENTS	115/230V ±10%, 50-400 Hz 50 watts
SIZE	
Height	7 1/4" (18.4 cm)
Width	17 1/4" (43.8 cm)
Depth	18 1/4" (46.4 cm)
WEIGHT	22 1/2 lb. (10.2 kg)

CUSHMAN INSTRUMENT WARRANTY

All instruments manufactured by Cushman Electronics, Inc. are warranteed against defects in material and workmanship for a period of one year from the date of original shipment. Cushman will repair or replace instruments, which prove to be defective, in accordance with the following policy. This policy does not apply to repair service, parts sales, nor does it apply to instruments, or parts of the instrument, which in the opinion of Cushman, have been altered or misused.

All Countries

- During the first three months after the date of original shipment, no charge for parts, replacement PC boards, labor, or freight for instruments serviced at an authorized Cushman Service Center. Free freight applies only within the customer's country. Method of transportation shall be designated by an authorized Cushman representative or Service Center.

- During the fourth through the twelfth month after the date of original shipment, no charge for parts, replacement PC boards, and labor for instruments serviced at an authorized Cushman Service Center. All transportation charges for instruments, parts, or replacement PC boards shall be paid by the customer during this period.

- Replacement PC boards during the first year are warranteed only when the defective boards have been identified by an authorized Cushman Service Center and the defective PC board is returned in accordance with Cushman's exchange board policy.

U.S.A. and Canada

In the U.S.A. and Canada an additional two year limited warranty is offered extending from the 13th until the 36th month from the date of original shipment. This warranty is effective beginning with instruments purchased on or after April 1, 1977. During this period, the following limited warranty policy applies:

- No charge for parts* used by an authorized Cushman Service Center to repair an instrument.

- Cushman will replace at no charge, PC boards which are found to be defective by an authorized Cushman Service Center. Defective boards must be returned to Cushman in accordance with Cushman's PC board exchange policy.

- All transportation charges for instruments, parts, and replacement PC boards shall be paid by the customer during this period.

* Cathode ray tubes and batteries excluded.

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Figure 1-1. Model CE-26A Signal Generator

SECTION 1
THEORY OF OPERATION

INTRODUCTION

1.01 In this section the Circuit Reference Series for circuit and component identification is defined, the overall functioning of the instrument is explained, and a description of the individual circuit boards is given.

CIRCUIT REFERENCE SERIES

1.02 The circuits of the instrument are referred to by the series 1000-1100, 2000-2800 and 3000-3100. 1000 is the Front Panel, 1100 is the Impedance Selector attached to the front panel, 2000 is the Main Chassis, 2100-2800 are the plug-in circuit boards, 3000 is the Rear Panel and 3100 is the RF Switch attached to the rear panel.

1.03 In each circuit the components are individually numbered. The complete identification for a component includes the circuit number. Thus the first resistor on the Power Amplifier board will be R2401, the third transistor will be Q2403, etc.

1.04 When the individual circuits are described in the Circuit Description section the component reference will be abbreviated. Only the circuit component number will be used, except when referring to a component in another circuit. In this case the full Circuit Reference Series number will be used.

1.05 Table 3-1 is a cross reference list of the PC board numbers and the Circuit Reference series. The PC board number is etched on each board. Each board may thus be identified. These numbers and the assembly numbers will also be found in the parts lists.

FUNCTIONAL DESCRIPTION

1.06 The CE-26A functions in a manner similar to a double conversion superheterodyne receiver, except that it generates an output signal. Two Local Oscillator (LO) signals are generated, one by a frequency synthesizer (12-21.1 MHz) and the other by a Voltage Controlled Crystal Oscillator (11.919-11.920 MHz). The 11.92 MHz LO is mixed with an 80 kHz signal derived from a 2 MHz Crystal Oscillator and this output is mixed with the 12-21 MHz LO to produce the required output frequency of 4 kHz to 9.1 MHz. See Figure 1-2.

1.07 The very stable 2 MHz Crystal Oscillator is the basic reference frequency of the instrument. It provides the reference for the frequency synthesizer which generates the LO frequency as well as generating the 80 kHz signal.

1.08 The LO frequencies may also be fed into the instrument from an external source. When the CE-26A is used as a Tracking Generator with the CE-21A Frequency Selective Level Meter, both LO signals originate in the CE-21A. When the CE-23A (CE-23) Spectrum Display is used in the TTS system with the CE-26A and the CE-21A in the Signal Generator Sweep mode, the 12-21 MHz swept LO is generated by the CE-23A.

1.09 The output of the CE-26A is adjustable over a range of -70 dBm to +10 dBm by means of two step attenuators, 10 dB and 1 dB per step, and a continuously adjustable control over a range of ±1 dB. Output is internally levelled to within 0.02 dB. The output level is the meter reading plus the attenuator setting. The output may also be switched off without affecting the rest of the circuits in the instrument.

1.10 FREQUENCY SYNTHESIZER PHASE LOCK LOOP

1.11 The phase lock loop circuit of the synthesizer is made up of the Voltage Controlled Oscillator, 2700, Divide-by-N, 2800, and Sample and Hold 2600, circuits. See Figure 1-2. The 2 MHz Master Crystal Oscillator output is divided down to 1 kHz and used to trigger a ramp generator. The ramp is sampled by the output pulse of the Divide-by-N (÷N) circuit to provide a DC output proportional to the phase relation between these signals. The Sample and Hold DC output is fed to the Voltage Controlled Oscillator to adjust the frequency so that the ÷N circuit output is a 1 kHz pulse. When the output is 1 kHz the frequency holds constant in this phase lock condition. The ÷N ratio is set by the front panel FREQUENCY selector switches. In this way each frequency dialed in is phase locked to the Master Oscillator crystal frequency. The output of the synthesizer is the LO to the second mixer where the output frequency is generated.

CIRCUIT DESCRIPTION

1.12 VOLTAGE CONTROLLED OSCILLATOR. 2700

1.13 This circuit is made up of nine separate oscillators, each adjustable over a range of 1 MHz, except the 20-21.1 MHz oscillator which has a range of 1.1 MHz. Part of the tuning capacitance is furnished by two varicaps in the base circuit of the transistor oscillator. Refer to Figure 3-12 where the 12-13 MHz oscillator is drawn in. The remainder of the oscillators are the same except for tuning component values. The individual oscillators are controlled by the voltage applied to the varicaps from

the Sample and Hold circuit. This voltage depends on the setting of the MHz and kHz dials. Output is amplified by the feedback pair, Q11, Q12, and then applied to the main output buffer, IC1.

1.14 DIVIDE-BY-N. 2800

1.15 The ÷N circuits divide the output frequency of the voltage controlled oscillator (VCO) by a ratio set up by the MHz and kHz Frequency Selector dials and produce a 1 kHz output when the VCO output is at the correct frequency.

1.16 Four programmable decade counters, IC1-3, IC5, and a dual flip-flop, IC10, divide down the VCO frequency, see Figure 3-13. IC9 is the coincidence gate, IC6, IC7, IC13 provide control logic, IC11 generates the reset pulse and IC14 is a one-shot that stretches the reset pulse to 25 μs, making it suitable for use in the Sample and Hold circuit.

1.17 The required LO frequency is the output frequency plus the IF. The division ratio for a 1 kHz ÷N output is the LO frequency divided by 1000. For example, if the output frequency were 3.456 MHz the LO would be 12.000 MHz +3.456 MHz equals 15.456 MHz. The division ratio would then be 15.456 MHz/1000 = 15,456. The counter must be programmed to count to this figure before producing an output. This is done when the Frequency Selector dials are set to the desired frequency, in the example above, to 3.456 MHz. (This example is shown in Figure 1-2.)

1.18 Since the total capacity of the four counters IC1-IC3, IC5 is only 10,000 (a maximum count of 9999), the count must reach the maximum from the preset figure and then start over again from zero and reach maximum a second time before an output pulse is generated. This is taken care of by the logic circuits, the dual flip-flop, IC10, and the coincidence gate, IC9. For output frequencies of 8.000 MHz and greater, the division ratio will be greater than 20,000, therefore the counter must count the remaining count from the preset figure plus two full count cycles before generating an output pulse. A switch on the MHz digit dial for the 8 and 9 positions controls the logic and the dual flip-flop through Q4 to make this possible.

1.19 The preset number for which the counters must be programmed is: the division ratio minus the total capacity, (as in the example above) 15,456 - 10,000 = 5456 remainder, and the maximum count minus the remainder, 9999 - 5456 = 4543, the preset number. This conversion is taken care of automatically by the wiring of the switches.

1.20 REFERENCE OSCILLATOR, REFERENCE DIVIDER. 2800

1.21 These circuits are also mounted on the ÷N board. The oscillator, Q1, Y1, generates a frequency of 2 MHz. CR1, a zener diode, regulates the collector voltage to provide good frequency stability. Small frequency adjustments may be made with C4, Figure 3-13.

1.22 Q3 is an overdriven amplifier, the output of which is a logic levels square wave. The 2 MHz output of Q3 is divided by 5 in both IC4 and IC8 to produce an 80 kHz output. This output is amplified in the tuned amplifier, Q5, the output of which is a sine wave, and is buffered through Q7 to the RF board, 2500, where it mixes with the 11.92 MHz LO in the First Mixer. The 80 kHz output of IC8 also goes to IC12 where it is divided by 2, to IC15 where it is divided by 4 and to IC16 where it is divided by 10, producing a 1 kHz output reference frequency. IC16 also processes the 1 kHz signal to produce a 20% duty cycle output. This output goes to the Sample and Hold board, 2600, where it controls the ramp generator.

1.23 SAMPLE AND HOLD. 2600

1.24 The Sample and Hold circuit provides the control voltage for the varicaps in the Voltage Controlled Oscillator circuit. The circuit output is a voltage proportional to the phase relationship between the 1 kHz output of the Reference Divider and the 1 kHz output of the ÷N circuit. When this relationship is constant the VCO is locked on frequency. If this phase relationship starts to change a correction voltage is generated and the VCO is brought back to the correct frequency.

1.25 The 20% duty cycle pulse from the Reference Divider, through board pin 3, turns on Q2 to discharge C5 for the duration of the pulse (20% of the time). See Figure 3-10. When Q2 is turned off C5 charges through constant current source, Q1, until the next pulse from the Reference Divider again turns on Q2. This develops an 80% duty cycle ramp. IC1 is a unity gain operational amplifier which furnishes a very high resistance load across C5 for ramp linearity and also couples the ramp to the FET switch, Q3, which is normally off.

1.26 The output pulse from the ÷N circuit is connected through board pin 5 to IC6-6, to IC4-5 and to amplifiers, Q4, Q5. Output from Q4 turns on Q3 for the pulse duration of 25 μsec. See waveform on lower part of schematic, Figure 3-10. This sample of the ramp level is stored on C10 and is prevented from leaking off by the high input impedance of IC2. The slope of the ramp makes this voltage unsuitable to control the VCO, it would cause a slight frequency jitter, so a second sample is taken at a later time when the level is constant. The output of IC2 is connected to a second sampling FET switch, Q6. IC6 pins 6,3, with C27 and R28 form a one-shot which is triggered by the input pulse from the ÷N circuit. The trailing edge of this pulse through IC4 pin 11 triggers a second one-shot, IC6 pins 9,13, with C28 and R30, which produces a pulse delayed by the width of the first one-shot pulse. The delayed pulse is buffered by two gates in IC5 pins 6,3, and is amplified by Q7, Q8, to turn on the second sampling gate,

Q6. The sampled output of Q6 is stored on C13 and is prevented from leaking off by the high impedance of amplifier, IC3. This level, buffered by IC3, is then connected through board pin 11 to the varicaps in the VCO to control the frequancy.

1.27 The UNLOCKED light control is also on this circuit board. The outputs from both the Reference Divider and the ÷N circuit are connected to the input of the NAND gate IC4 pins 4,5. If the circuit is out of lock the Reference Divider and ÷N pulses will not be the same frequency and so will rapidly drift through each other. At coincidence IC4 pin 6 will go low and, through inverter IC4 pin 8, trigger the one-shot, IC5 pins 12,14 with C26 and R27. This output will turn on switch Q11 to cause the UNLOCKED lamp to light. IC4 pin 6 and the one-shot will continue to be triggered until the circuit is again in phase lock, at which time the light will go out.

1.28 VOLTAGE CONTROLLED CRYSTAL OSCILLATOR. 2700

1.29 This oscillator generates the LO frequency which is mixed with the 80 kHz from the Reference Divider to produce an IF variable from 11.999 to 12.000 MHz. The Voltage Controlled Crystal Oscillator (VCXO) is variable from 11.919 to 11.920 MHz by adjusting the voltage on the varicap, CR3. See Figure 3-11. The 100 Hz digit dial, R1002, adjusts this voltage. Both ends of R1002 are connected to adjustable voltage dividers, R32 ("0" ADJ) and R34 ("900" ADJ), which are used to calibrate the 100 Hz dial at 0 and 900 Hz. The oscillator is Q9, controlled by the 11.92 MHz crystal, Y1. Output is buffered through Q10.

1.30 RF CIRCUITS. 2500

1.31 The RF circuits include the INT-EXT diode switches, the mixers and amplifiers for generating the output frequencies, the level control and meter circuits, Figure 3-9.

1.32 The 11.92 MHz LO from the CE-21A for External operation or from the CE-26A VCXO for Internal operation is controlled by diode switches CR1-CR6 which in turn are controlled by the Front Panel INT-EXT switch. Likewise the 12-21 MHz LO is controlled by diode switches CR11-CR16 also controlled in turn by the INT-EXT switch.

1.33 The 11.92 MHz LO from either source is amplified in IC1 and applied to T1 of the mixer T1, T2, CR7-CR10. The input to T2 is the 80 kHz output from the Reference Divider, 2800. The conversion with 80 kHz is necessary because the second IF in the CE-21A is 80 kHz and the frequency relationships must be kept exact. The VCXO or EXT frequency varies from 11.9189 to 11.920 MHz with adjustment of the 100 Hz dial. The IF then will be 80 kHz higher, 11.9989 to 12.000 MHz. This IF is passed through the 11.9995 MHz crystal filter, FL1, which has a bandwidth of 5 kHz. This removes unwanted sidebands. The IF then goes to the ALC amplifier, IC2, and then to T4 of the second mixer T3, T4, CR17-CR20.

1.34 The 12-21.1 MHz LO either External or Internal passes through the diode switches CR11-CR16, through the 22 MHz low pass filter, L10, L11, C26-CR28 to the 12-21 LO amplifier, Q2-Q4 and then to T3 of the second mixer. The output from this mixer is the desired 4 kHz to 9.1 MHz output frequency. The output goes to the Power Amplifier, 2400.

1.35 An output from the Power Amplifier is rectified by CR2405 and brought back to the 2500 board and connected to the negative input of Operational amplifier IC3 to provide Automatic Level Control (ALC). C40, C41 are filter capacitors across feedback resistor R54 of IC3, to reduce ALC ripple. K1, controlled by Q1, is closed in the INT mode and open in the EXT mode. Reduced filter capacity is required in the EXT mode to increase ALC response time when the frequency is swept by the CE-23A (CE-23). CR22 limits negative excursions of the output and CR21 temperature compensates CR2405.

1.36 Output from IC3 goes both to the Meter Amplifier, IC4, and to the DC loop amplifier, IC5. Output from IC4 goes to the meter. R59 is the meter calibrating adjustment. Output from IC5 is the ALC voltage which is connected to the ALC Amplifier, IC2.

1.37 POWER AMPLIFIER. 2400

1.38 Output from the RF circuits enters the Power Amplifier at pin 2, goes through a 9.3 MHz low pass filter to pre-amplifier, IC1. See Figure 3-8. Output from the pre-amplifier is amplified by a phase inverter pair, Q1, Q2. Feedback from the output of the balanced amplifier is applied to each base of these amplifiers through C31, R26 and C32, R27. Phase inverter outputs are amplified by Q3, Q4 and Q5, Q7. Outputs from Q5, Q7 are applied to two pairs of complemetary emitter follower power amplifiers Q8, Q9 and Q10, Q11. CR1-CR4 set the base bias. Output from these amplifiers then goes to the output balancing circuits C41, R37, R38, R41, adjustment being made with R41 and C41. Output from the balancing circuits passes through matching networks R39, C47, R40, C48 through coupling capacitors C45 and C46 to the "A" and "B" Attenuators through pins 19 and 21. An output through C39, R36, C40, CR5 to pin 16 goes to the RF Circuits to provide Automatic Level Control as noted in paragraph in 1.35.

1.39 "A" AND "B" ATTENUATORS. 2100, 2200

1.40 Each of the two outputs from the RF circuits is connected to one of the Attenuators. The two Attenuators are identical and consist of pads which are switched into the circuit by the LEVEL switches on the front panel. See Figures 3-5, 3-6. One switch, S1008, controls the 1 dB, 2 dB, 4 dB

and 8 dB pads to provide 1 dB steps. The other switch, S1006, controls the 10 dB, 20 dB and 40 dB pads to provide 10 dB steps. The front panel switches control relays K1-K7 in each attenuator to switch the pads in and out. The diodes and capacitors around each relay coil provide transient suppression.

1.41 IMPEDANCE SELECTOR. 1100

1.42 The IMPEDANCE Selectors are mounted inside a shielded enclosure and attached to the front panel. The 75Ω UNBAL output, through the upper coaxial connector, is connected directly to the output of the "A" Attenuator while the "B" Attenuator is terminated by R9. See Figure 3-3. The 124Ω balanced output, thru both coaxial jacks, is matched with resistors R5-R8. 600Ω balanced output, also through the coaxial jacks, is matched with 135Ω/600Ω output transformer, T1, which is fed from the 135Ω balanced output. 135Ω balanced output is matched with resistors R1-R4 and is connected to the dual phone jacks. Each circuit, from the "A" and "B" Attenuators, is connected to the proper output jacks when the designated front panel switch is depressed.

1.43 RF SWITCH. 3100

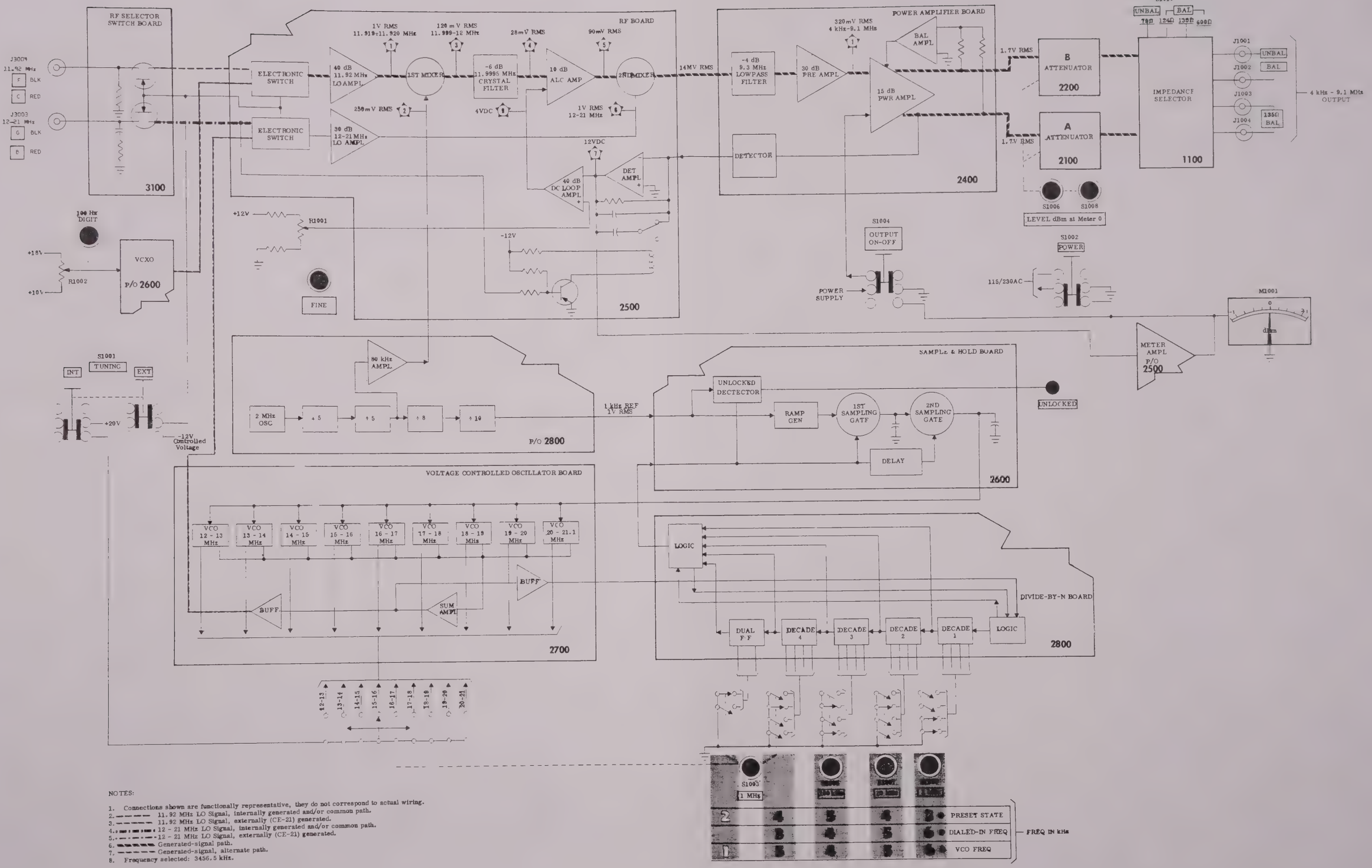
1.44 The RF Switch, Figure 3-15, is mounted on a board attached to the rear panel over the external LO input connectors. The FET switches, Q1, Q2, are controlled by the INT-EXT switch on the front panel. When used with the CE-21A or the TTS this RF switch, in addition to the diode switches on board 2500, provides the required isolation from the external LO signal when the CE-26A is used in the INT TUNING mode.

1.45 POWER SUPPLY. 2300

1.46 The outputs of bridge rectifiers, CR1-CR4, CR7 CR10, CR 12 CR15, which are supplied by three secondaries of power transformer T2001 (Figure 3-7), are connected to four regulators to provide +20V, +12V, +5V and -12V to the instrument. Transformer T2001, also has an additional secondary which furnishes 5.5V AC for the front panel indicator lights.

1.47 The four regulators are conventional. The series regulator transistors Q3001, Q3002, Q3003 and Q3004 are mounted on the rear panel to provide them with a good heat sink. IC1, IC2 compare the voltage across zener diode CR6 with the voltage at the adjust points on R9 and R12 for +20V and +12V. Likewise IC4 compares the zener voltage of CR17 with the voltage adjust point on R27 for -12V. The +5V supply voltage adjust resistor, R18, is tied to the regulated -12V and does not need a zener reference source. IC3 compares the adjust point on R18 with ground.

1.48 IC2 drives the series regulator transistor Q3001 directly. The other comparators drive their respective series regulator transistors through driver amplifiers Q1, Q3, Q5. Q2, Q4, Q6 limit the current in the circuit to a safe level in case of an overload or short circuit of any of the regulator outputs.



NOTES:

1. Connections shown are functionally representative, they do not correspond to actual wiring.
2. ▬ ▬ ▬ 11.92 MHz LO Signal, internally generated and/or common path.
3. ▬ · ▬ · ▬ 11.92 MHz LO Signal, externally (CE-21) generated.
4. ▬ ▬ ▬ 12 - 21 MHz LO Signal, internally generated and/or common path.
5. ▬ · ▬ · ▬ 12 - 21 MHz LO Signal, externally (CE-21) generated.
6. ▬▬▬ Generated-signal path.
7. ▬ ▬ ▬ Generated-signal, alternate path.
8. Frequency selected: 3456.5 kHz.

Figure 1-2. Model CE-26A Overall Block Diagram

SECTION 2
MAINTENANCE

GENERAL

2.01 This section of the manual contains the information necessary to check the performance and to adjust and calibrate the CE-26A Signal Generator.

2.02 The Performance Checks may be used to verify proper operation. Adjustment and Calibration procedures are to be followed if the performance checks indicate out of tolerance operation.

2.03 If the Adjustment procedures fail to correct trouble, and the cause of the trouble is not readily apparent or easily repairable, it is recommended that the faulty circuit board or the whole instrument be returned to the factory or to a service center for repair. Always contact the Customer Service Department before returning equipment. See paragraph 2.26.

2.04 The CE-26A should be turned on and warmed up for a few minutes before beginning the Performance Checks or the Adjustment and Calibration Procedures. Figure 2-1 shows the arrangement of the circuit boards and the location of the circuit adjustments.

PERFORMANCE CHECK

2.05 TEST EQUIPMENT REQUIRED

Frequency Counter	Dana 1800 or counter with 10 MHz capability
Frequency Selective Voltmeter	CE-21A or equivalent
Milliwatt Power Meter	Western Electric 73B or equivalent
10 dB and 1 dB Step Attenuator	Daven 8500L3-75-100-0.1-2 with known accuracy for each step and at 1 and 9 MHz or equiv.

2.06 OUTPUT FREQUENCY

a. Set CE-26A controls as follows:

LEVEL	+9 dBm
FINE	0 dBm on meter
OUTPUT switch	ON
TUNING	INT
OUTPUT IMPEDANCE	75Ω UNBAL

b. Connect 75Ω UNBAL output to counter.

c. Dial FREQUENCY controls through full range for each digit. Ignore error due to last dial digit. Settings should agree with counter.

d. Set FREQUENCY to 1.000 kHz and turn 100 Hz dial through its full range. All settings should agree with counter within 50 Hz.

2.07 BALANCE

a. Set CE-26A controls as follows:

FREQUENCY	9.100 MHz
LEVEL	+3 dB
OUTPUT IMPEDANCE	124Ω

b. Connect 124Ω upper jack of CE-26A output to 75Ω UNBAL input of CE-21A. Terminate lower 124Ω jack on CE-26A with 75Ω. (The small mismatch will not affect the readings.)

c. Tune in signal on CE-21A, set meter to expanded scale and adjust FINE control on CE-26A until CE-21A reads 0dBm on the meter.

d. Reverse OUTPUT connections at CE-26A output. CE-21A should indicate 0 dBm ±0.05 dB.

e. Since there is no adjustment on the other balanced outputs they are assumed to be correct when the BAL 124Ω output is checked. A further check may be made to confirm that there has been no resistor damage.

f. With a Balanced line patch cord connect the CE-26A to the CE-21A. Place output Impedance selectors to 600Ω on both instruments. Tune in signal and check that level indicated is within the combined specifications of the two instruments.

g. Set both instruments to 135Ω and repeat f. Use proper patch cord.

2.08 OUTPUT LEVEL

a. Set CE-26A controls as follows:

FREQUENCY	1.000 MHz
LEVEL	0 dBm
FINE	0 dBm on meter
OUTPUT IMPEDANCE	75Ω

b. Calibrate WE-73B according to the instrument procedures.

c. Connect CE-26A to WE-73B and read level. Level should be 0 dBm ±0.02 dB. Note reading.

d. Disconnect WE-73B from CE-26A.

2.09 FREQUENCY RESPONSE

a. Set CE-26A FREQUENCY to 9.100 MHz, readjust FINE for 0 dBm on meter, other controls the same as in para. 2.08.

b. Recheck calibration of WE-73B and connect to CE-26A. Should read within ±0.05 dB of reading obtained in para. 2.08c.

c. Disconnect WE-73B and set CE-26A to 8.000 MHz, readjust FINE for 0 dBm on meter. Reconnect WE-73B and note reading.

d. Repeat c. for the following frequencies:

7.000 MHz	4.000 MHz	1.000 MHz
6.000 MHz	3.000 MHz	100 kHz
5.000 MHz	2.000 MHz	4 kHz

CAUTION

Do not attempt to check frequencies below 4 kHz since the L.O. signal may come through and damage the WE-73B thermocouple.

e. All readings should be within ±0.05 dB of reading obtained in para. 2.08c.

2.10 ATTENUATOR CHECK

a. Set the CE-26A controls as follows:

FREQUENCY	1.000 MHz
LEVEL	-0 dBm
FINE	0 dBm on meter
TUNING	INT
OUTPUT IMPEDANCE	75Ω

b. Set CE-21A controls as follows:

FREQUENCY	1.000 MHz
dB2	-60 dBm
dB1	0 dBm
IMPEDANCE	75Ω UNBAL TERM
BANDWIDTH	2.3 kHz
MODE	LOW NOISE

c. Set the 75Ω attenuator for 60 dB attenuation and connect between UNBAL output of CE-26A and UNBAL input of CE-21A.

d. Set CE-21A to 0 dB on meter in EXP and bring needle to exactly 0 dB with CAL control.

NOTE

Because of the high accuracy of the CE-26A attenuator, the test attenuator must be specially calibrated both for attenuation and frequency at the test frequencies used. The error then must be taken into account at each setting of the attenuators. Precautions against ground loops must also be observed, such as isolating one instrument from AC line ground, placement of instruments, good ground between instrument chassis, etc.

e. Step down the CE-26A LEVEL attenuator in 10 dB steps, at the same time removing 10 dB from the test attenuator and observe deviation of meter on CE-21A at each step. Deviation must not be more than ±0.1 dB ± the error of the test attenuator. Continue until CE-26A attenuator is -60 dBm. Step attenuators back to original setting and check that CE-21A meter still reads 0 dBm.

f. Set CE-26A to +0 dBm and then go up in 1 dB steps at the same time adding 1 dB per step with the test attenuator and observe the meter on the CE-21A. Deviation must not be more than ±0.1 dB ± error of attenuator. Step back to 0 dB and observe that CE-21A meter is still on 0 dBm.

g. Set CE-26A to +1 dBm and set FINE to -1 dBm on meter. Set test attenuator to 2 dB. CE-21A should again read 0 dB ±0.02 dB. This checks linearity of meter scale. Set CE-26A and test attenuator to 0 dB.

h. Set both CE-26A and CE-21A to 9.100 MHz and repeat steps d, e, and f. Deviation must not be more than ±0.1 dB ± error of test attenuator.

NOTE

If greater than specified deviation of level is observed it most likely will be due to test setup problems and ground loops or to improper application of attenuator error. Check thoroughly before assuming CE-26A to be faulty.

ADJUSTMENT AND CALIBRATION

2.11 TEST EQUIPMENT REQUIRED

Frequency Counter	Dana 8100 or counter with 10 MHz capability
DC Voltmeter	Dana 4700 or equivalent
Frequency Selective Levelmeter	CE-21A or equivalent
Milliwatt Power Meter	WE-73B or equivalent
Oscilloscope	HP 180A/1801A/1820A or equivalent
RF Voltmeter	Boonton 91DA or equiv.

2.12 POWER SUPPLY. 2300

a. Power supply voltages are most readily available at the Power Supply board 2300 jack, J2004. Remove bottom cover and place CE-26A on its side to gain access to the jack.

b. Check that 115/230 VAC switch on the rear panel is in the proper position for the AC power used. Connect to AC supply using a Variac set for 115 or 230 VAC. Turn on CE-26A by depressing the power switch.

c. Using the DC voltmeter check the voltages. The voltages, terminals and adjustment controls are listed below. See Figure 2-1.

Voltage	Term	Adjust
+20 V	13	R9 (+20)
+12	4	R12 (+12)
+ 5	6	R18 (+ 5)
-12	10	R27 (-12)

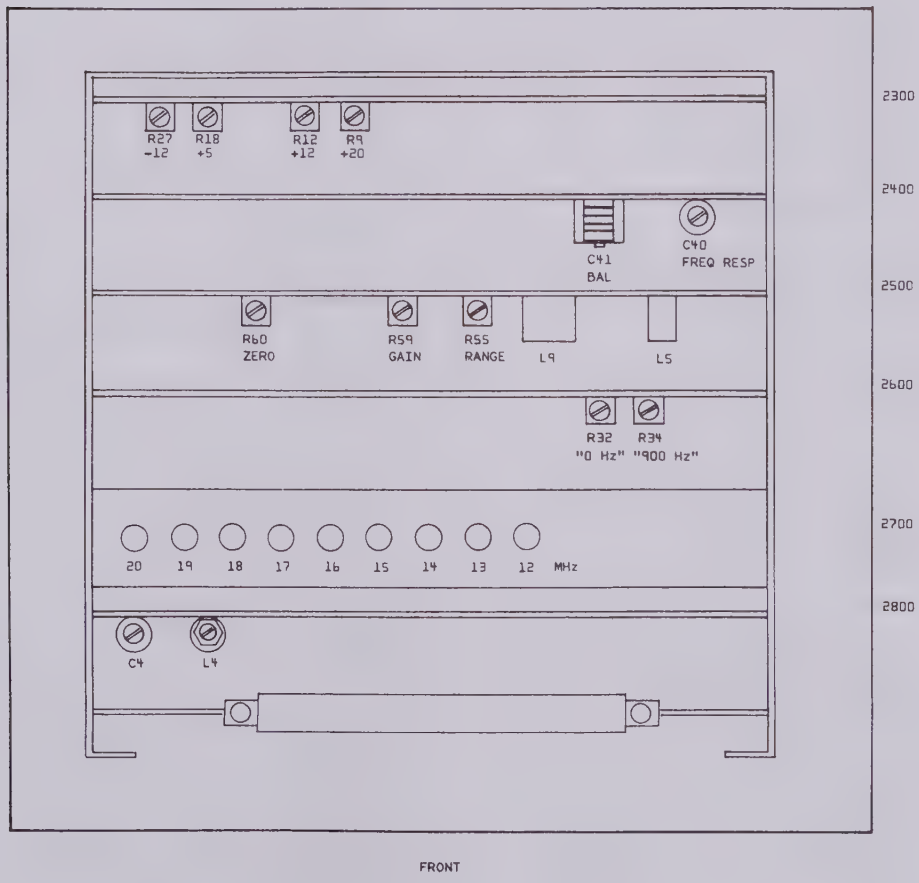


Figure 2-1. CE-26A Board and Adjustment Locations, Top View

d. Voltage should not change more than ±0.5 volts as Variac is changed from 105-125 (210-250) VAC.

2.13 2.0 MHz ADJUST. 2800

a. Place 2800 board on extender.

b. Connect counter to TP1 using a X10 scope probe.

c. Adjust C4 for a reading of 2.000 000 MHz on the counter.

d. Replace 2800 board in chassis.

2.14 80 kHz ADJUST. 2800

a. Place 2500 board on the extender. (Board 2500 is raised in order to get at a convenient 80 kHz TP. Adjustment is made on board 2800.)

b. Connect oscilloscope to TP2502.

c. Adjust L4 for maximum amplitude, (approximately 0.8V p-p) and best waveform.

d. Connect counter to TP2502 (do not use X10 probe) and check for frequency of 80 kHz.

e. Replace 2500 board and raise 2800 board on extender.

f. Connect oscilloscope to TP3. Check for 1 kHz pulse, 200μsec wide and amplitude approximately 3V p-p.

g. Replace 2800 board in chassis.

2.15 VCO ADJUSTMENT

a. Connect DC voltmeter to pin 11 on J2004 (chassis jack for board 2600).

b. Set CE-26A FREQUENCY to 0.999.

c. Adjust 12 MHz coil (Figure 2-1) for a reading of +13 VDC on meter.

d. Set FREQUENCY, and adjust inductor according to following list. Set each inductor for a reading of +13 VDC on the meter.

FREQ	INDUCTOR ADJ
1.999	13 MHz
2.999	14 MHz
3.999	15 MHz
4.999	16 MHz
5.999	17 MHz
6.999	18 MHz
7.999	19 MHz
9.100	20 MHz

e. Check for a meter reading of 4.5V ±0.5 VDC while dialing one MHz steps from 0.000 through 8.000 MHz.

2.16 11.92 MHz LO AMPLIFIER AND ALC AMPLIFIER ADJUST. 2500

a. Place 2500 board on extender.

b. Set CE-26A FREQUENCY to 0.999 MHz.

c. Connect RF Voltmeter with high impedance probe to TP1 and adjust L5 for maximum reading on meter, approximately 1 VAC rms.

d. Disconnect jumper between TP8 and TP9. Connect TP9 to TP10 with clip lead. (This provides fixed bias for ALC amplifier.)

e. Connect RF Voltmeter to TP5.

f. Adjust L9 for maximum reading on RF Voltmeter, approximately 90 mV rms.

g. Reconnect jumper between TP8 and TP9.

h. Replace 2500 board in chassis.

2.17 OUTPUT FREQUENCY ADJUST. 2600

a. Set CE-26A attenuator to +9 dBm.

b. Connect counter to 75Ω UNBAL jack and dial digits through the full range. Ignore error due to last dial digit. All settings should agree with counter.

c. Set FREQUENCY to 1000.0 kHz. Set 100 Hz dial to "0". Adjust the "0" Hz (R32) control for 1.000 000 on the counter.

d. Set 100 Hz dial to "9". Adjust "900" Hz (R34) for a reading of 1.000 900 on the counter.

e. Repeat c. and d. until adjustment is no longer necessary.

f. Check tracking of 100 Hz dial. All settings should be within 50 Hz of counter readings.

2.18 BALANCE ADJUST. 2400

a. Place 2400 board on extender.

b. Set CE-26A controls as follows:

FREQUENCY	9.100 MHz
LEVEL	+3 dBm
OUTPUT IMPEDANCE	124Ω

c. Connect the upper 124Ω jack of the CE-26A to the 75Ω INPUT of the CE-21A. Terminate the lower 124Ω jack with 75Ω. (The small mismatch will not affect the adjustment.)

d. Tune in signal on CE-21A and place meter on EXP scale. Adjust CE-26A FINE control for 0 dB reading on the CE-21A.

e. Reverse OUTPUT connections at CE-26A and adjust C41 for the same reading on CE-21A as noted in d.

f. Reconnect as in c. and check for 0 dB reading. If reading has shifted adjust to 0 dB with FINE control and repeat e. Continue adjustments until same reading is obtained from both outputs.

g. Replace 2400 board in chassis and recheck d. through f.

2.19 OUTPUT LEVEL ADJUST. 2500

a. Make rear panel connections between the CE-26A and the CE-21A. (Connect Red B to Red B and Red C to Red C.)

b. Set CE-26A controls as follows:

FREQUENCY	1.000 MHz
TUNING	INT
LEVEL	+0 dBm
FINE	0 dBm on meter
OUTPUT IMPEDANCE	75Ω UNBAL

c. Set FINE to mid-range. (Connect a DC voltmeter set to 5V range between ground and the violet wire on the FINE adjust control. Adjust control for a reading half way between extremes, approximately 2 VDC. Remove meter.)

d. Calibrate WE-73B according to instrument procedures.

e. Connect output of CE-26A to WE-73B and adjust Fine Adj. Range (R55) for 0 dBm on WE-73B.

f. Disconnect CE-26A from WE-73B and set CE-26A LEVEL to +1 dBm and adjust FINE for approximately -1 dBm on the Output meter. Reconnect to WE-73B and adjust FINE control for 0 dBm on WE-73B. Adjust Zero (R60) for exactly -1 dBm reading on output meter.

g. Disconnect CE-26A from WE-73B and set CE-26A LEVEL to -1 dBm and adjust FINE for approximately +1 dBm on Output meter. Reconnect to WE-73B and adjust FINE control for a 0 dBm reading on WE-73B. Adjust Gain (R59) for exactly +1 dBm reading on output meter.

h. Repeat steps d, e, f, and g until no further adjustment is required. ±1 dB readings should be better than ±0.05 dB and 0 dB should be within ±0.02 dB. (A slight adjustment of R60 may be made to bring 0 dB reading right on. If this adjustment is made recheck e. and f. to make certain they are still within tolerance.)

i. Disconnect CE-26A from WE-73B and switch TUNING to EXT. Reconnect CE-26A to WE-73B. Level should remain the same as in INT TUNING ±0.02 dB.

j. Disconnect CE-26A from WE-73B and switch TUNING to INT.

2.20 FREQUENCY RESPONSE

a. Set CE-26A as in para. 2.19b, except set frequency to 9.100 MHz. Readjust FINE for 0 dBm meter reading.

b. Recheck calibration of WE-73B.

c. Connect CE-26A to WE-73B and adjust C2440 (FREQ. RESP.) for a 0 dBm reading on the WE-73B.

d. Disconnect WE-73B and set CE-26A to 8.000 MHz. Readjust FINE for 0 dBm meter reading. Reconnect WE-73B and note reading.

d. Repeat d. for the following frequencies:

7.000 MHz	4.000 MHz	1.000 MHz
6.000 MHz	3.000 MHz	0.100 MHz
5.000 MHz	2.000 MHz	4 kHz

Do not attempt to check frequencies below 4 kHz as the L.O. signal may come through and damage the WE-73B thermocouple.

f. Readings should remain the same ± 0.05 dB.

g. Disconnect the CE-26A from the WE-73B.

TROUBLESHOOTING

2.21 When trouble is experienced make certain it is not caused by conditions external to the instrument.

a. Check that POWER panel light is on. If not, check fuse and AC supply. If light is on make certain that all switches and controls are properly set and that cable plug is connected into the correct output.

b. Follow the procedures given in Table 2-1 to locate the area of the trouble.

Table 2-1. Troubleshooting Chart

Indication	Possible Cause	Check
UNLOCKED indicator on	Dialed in FREQUENCY greater than 9.2 MHz	Check FREQUENCY switch setting
UNLOCKED indicator on only at certain MHz dial settings	Associated MHz oscillator not operating	Check VCO circuit and adjust as necessary (para. 2.15)
UNLOCKED indicator on at all dialed frequencies	Defective component in frequency synthesizer loop (Boards 2600, 2700, 2800)	Check VCO and 2.0 MHz oscillators (para. 2.13, 2.15)
All FREQUENCY dial lights on but no output	Defective component in power supply	Check power supply voltages (para. 2.12)
Same as above and power supply ok	Defective component in board 2400 or 2500	Check for proper signal voltages at test points as shown on board 2400 and 2500 schematics
No output at some settings of IMPEDANCE selector	Plugged into wrong set of jacks	135Ω output available only at 135Ω jacks. Other outputs not available at these jacks.
Same as above and plugged in correctly	Defective component on impedance selector board	Trace out and repair or return to factory for repair (See para. 2.03, 2.26)
No output when EXT switch depressed	Connection to CE-21A or CE-23A not made or improperly made	Check connections according to color coding of connectors

PREPARATION FOR RESHIPMENT

2.22 It is recommended that the shipping box and foam packaging be kept in case it becomes necessary to return the instrument to the factory or service point for service or repair.

2.23 The following paragraphs contain a general guide for repackaging of the instrument for shipment.

NOTE

If the instrument is to be shipped, attach a tag to the instrument identifying the owner, and indicating the service or repair to be accomplished. Include the model number and full serial number of the instrument. In correspondence, identify the instrument by model number, serial number, and part number.

2.24 If the original container is to be used, proceed as follows:

a. Place the instrument in the original container. (If the original container is not available, one can be purchased from Cushman Electronics.)

b. Make sure that that the container is well sealed with strong tape or metal bands.

2.25 If the original container is not used, proceed as follows:

a. Wrap the instrument in plastic or heavy paper before placing it in an inner container.

b. Place packing material around all sides of the instrument.

c. Place the instrument and inner container in a heavy carton or wooden box, and seal it with strong tape or metal bands.

d. Mark the shipping container: "DELICATE ELECTRONIC INSTRUMENT", "FRAGILE".

SERVICE OR REPAIR

2.26 In the event service or repair is required, contact:

Cushman Electronics, Inc.
Customer Service Department
2450 North First St.
San Jose, California 95131
Area Code: 408
Telephone: 263-8100

Repair service for Cushman Electronics equipment is also available at:

BCS Associates, Inc.
940 North Fern Avenue
Orlando, Florida 32803
Area Code: 305
Telephone: 896-4881

SECTION 3
PARTS LISTS AND SCHEMATIC DIAGRAMS

INTRODUCTION

3.01 The following parts lists and schematic diagrams have been arranged in order according to the Circuit Reference Series numbers. Refer to paragraph 1.02. Each schematic diagram and parts list is identified with this number. The circuit boards in the instrument are stamped with an identifying Printed Circuit Board number. See Cross Reference, Table 3-1 below.

3.02 Parts list pages are grouped with the schematic diagrams to which they refer. Component identification drawings showing the location of the individual components on the circuit boards are placed on the inner sheet of the schematic diagram to which they apply.

Table 3-1. Printed Circuit Board to Circuit Reference Numbers Cross Reference

Circuit Board Number	Description	Circuit Reference Number
1780-0178	"A" Attenuator	2100
1780-0179	"B" Attenuator	2200
1780-0180	Power Supply	2300
1780-0181	Power Amplifier	2400
1780-0182	RF Circuits	2500
1780-0183	Sample and Hold	2600
1780-0185	Divide-by-N	2800
1780-0187	RF Switch	3100
1780-0188	Voltage Controlled Oscillator	2700
1780-0189	Impedance Selector	1100

FRONT PANEL. 1000

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Assembly, Front Panel	7003-0071	Cushman	
	Front Panel	2800-0086	Cushman	
	DIODE			
CR1	Silicon Signal, 75 PIV	1281-0013	Teledyne	1N3064
	JACKS			
J1	Jack, Coaxial	2586-0009	Trompeter	J3DW
J2	Jack, Coaxial	2586-0009	Trompeter	J3DW
J3	Jack, Twin Phone	2586-0008	Switchcraft	MT-388
J4	Jack, Twin Phone	2586-0008	Switchcraft	MT-388
	LAMPS			
DS1	T-1 Bulb, 5V, 60mA	2870-0014	Display Device	100060-683
DS2	T-1 Bulb, 5V, 60mA	2870-0014	Display Device	100060-683
DS3	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
DS4	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
DS5	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
DS6	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
DS7	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
DS8	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
DS9	6.3V, 1 3/4 Bulb	2870-0013	Chicago Min.	7381
	HOLDERS			
XD1	Flat red lens, T-1 Indicator lamp	1965-0007	Display Device	101BWXXXTR15
XD2	Flat green lens, T-1 Indicator lamp	1965-0009	Display Device	101BWXXXTG15
	METER			
M1	Microammeter, DC, 0-100μA	1402-0025	Cushman	
	RESISTORS			
R1	Pot, 1k, ±10%, 3/4W	1203-0040	CTS	VA-300
R2	Pot, 1 Meg, ±10%, 2W, Digit 5	1203-0033	Cushman	
R3	WW, .25Ω, ±3%, 3W	1159-0003	Dale	RS-2B
	SWITCHES			
S1	Two Station Push Button	1852-0007	Cushman	
S2	Power Push Button	1852-0008	Cushman	
S3	Rotary, 1 MHz Digit	1851-0057	Cushman	
S4	Rotary, 4 Pole 2 Position	1851-0066	Alco Switch	MSRA-4-2S
S5	Rotary, Digit 2	1851-0027	Cushman	
S6	Rotary, Tens Atten.	1851-0047	Cushman	
S7	Rotary, Digit 3	1851-0027	Cushman	
S8	Rotary, Ones Atten.	1851-0048	Cushman	
S9	Rotary, Digit 4	1851-0027	Cushman	
S10	Pushbutton, 4 Station	1852-0005	Cushman	
	TERMINAL BOARDS			
TB1	6 Lug	1760-0014	Cushman	
TB2	6 Lug	1760-0014	Cushman	
TB3	6 Lug	1760-0014	Cushman	
TB4	6 Lug	1760-0014	Cushman	

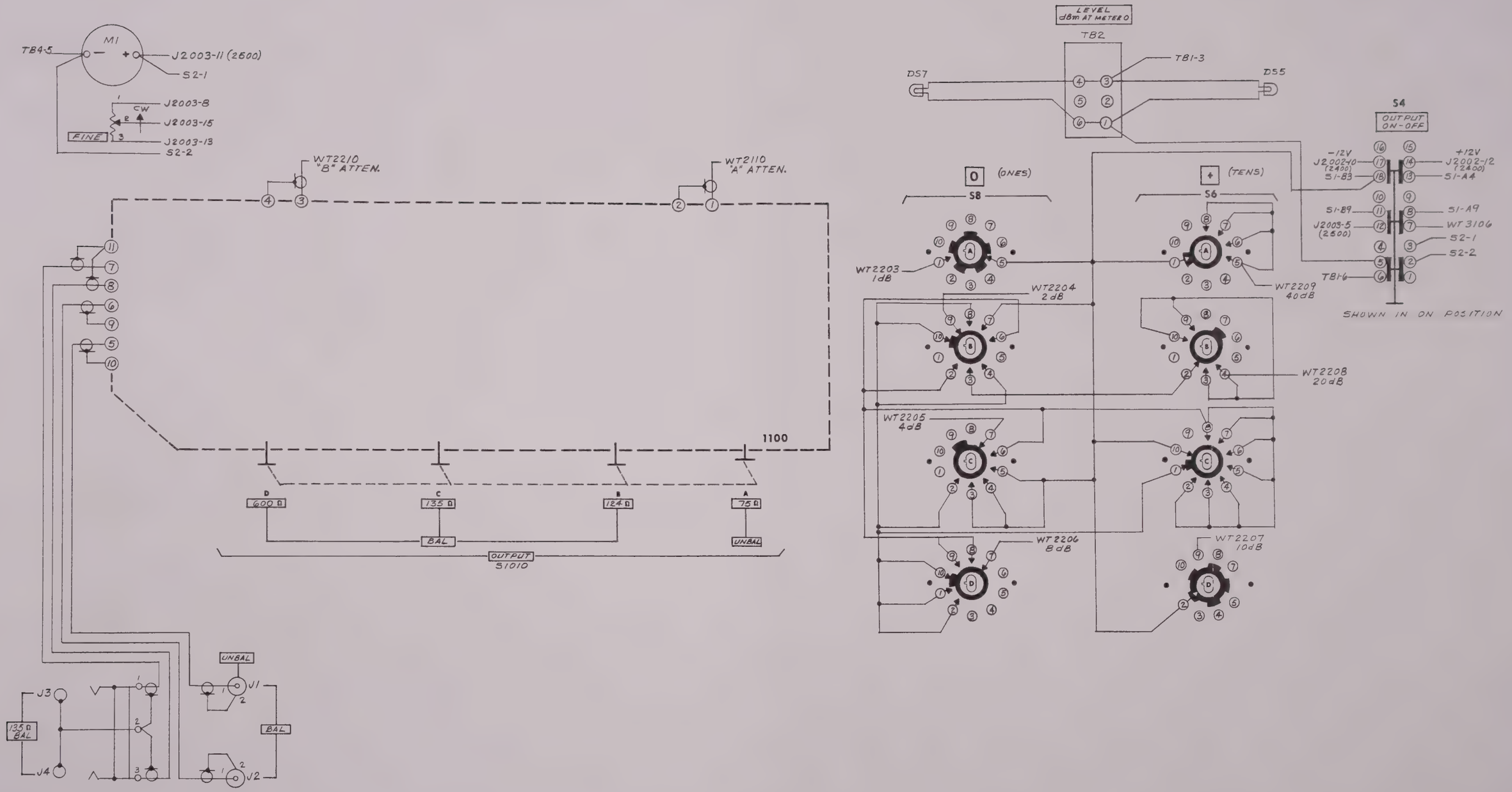


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Figure 3-1. Front Panel Interconnection Diagram, sheet 1. 1000

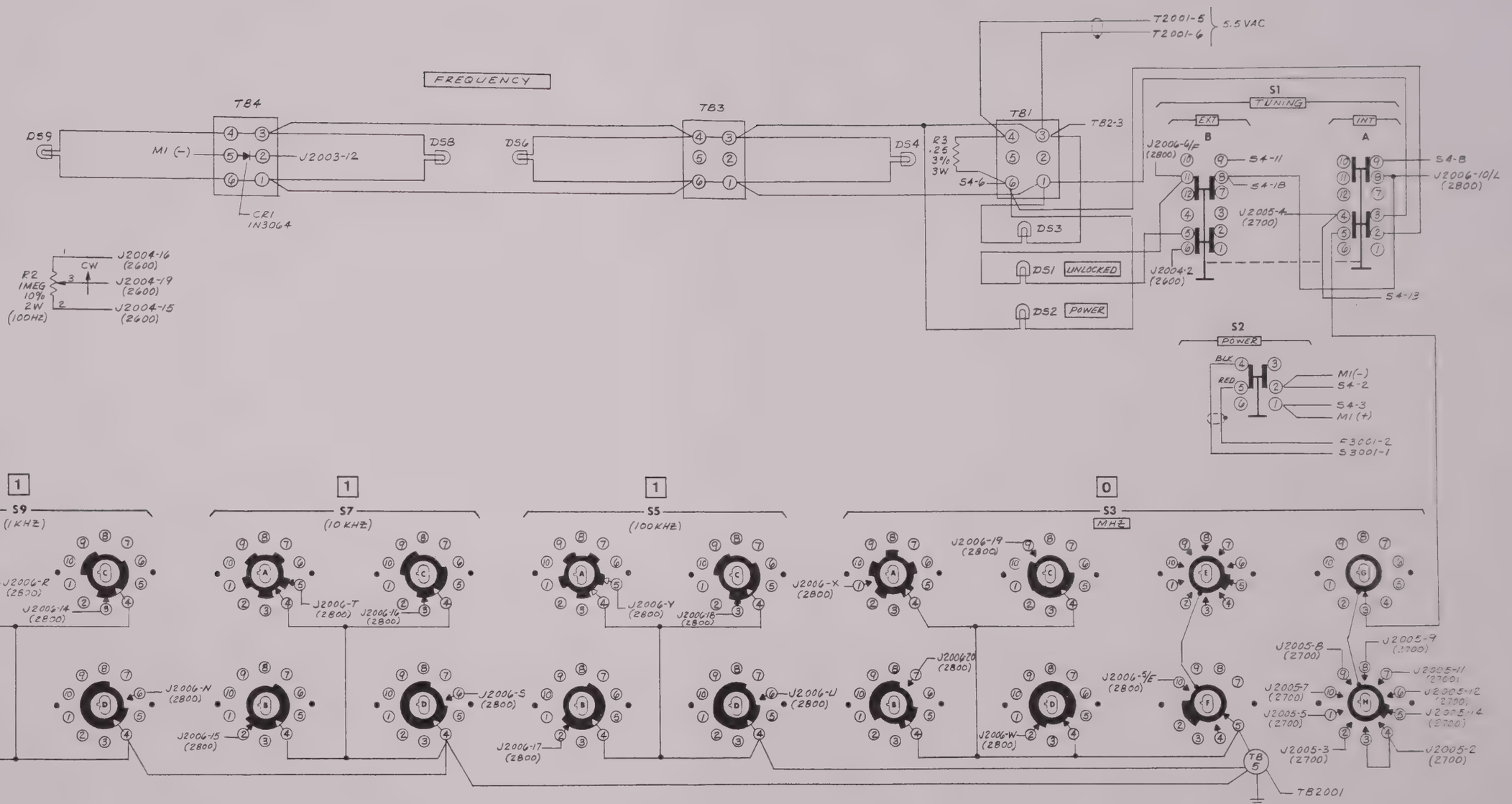
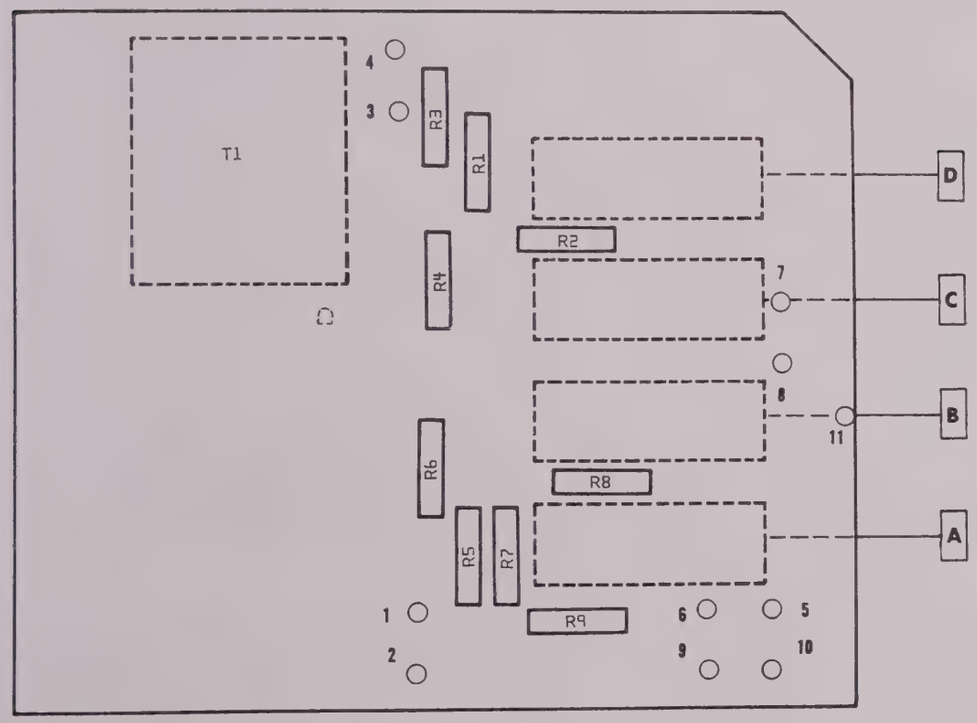


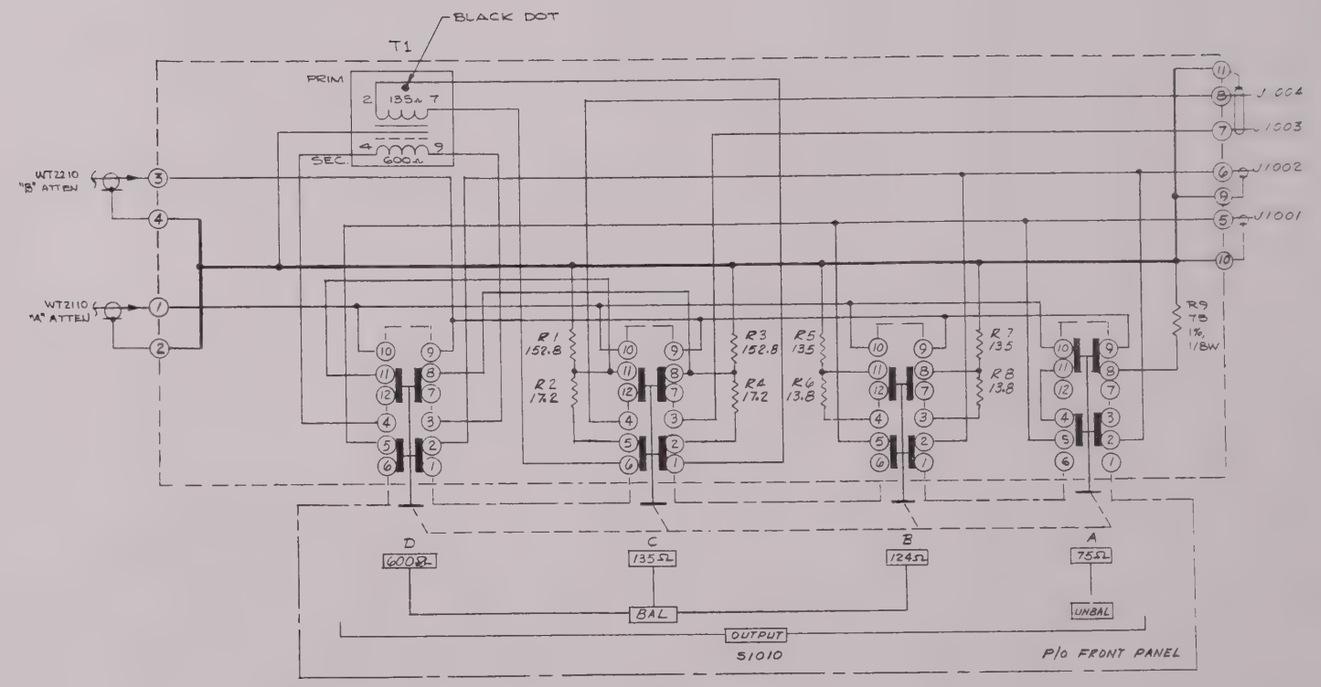
Figure 3-2. Front Panel Interconnection Diagram, sheet 2. 1000

3-5/3-6

IMPEDANCE SELECTOR. 1100

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	P.C. Board Assy. Impedance Selector	7001-0193	Cushman	
	P.C. Board Impedance Selector	1780-0189	Cushman	
	RESISTORS			
R1	Metal Film, 152.8Ω, ±.1%, 1/10W	1074-0091	Dale	MF 1/10 T2
R2	Metal Film, 17.2Ω, ±.1%, 1/10W	1074-0088	Dale	MF 1/10 T2
R3	Metal Film, 152.8Ω, ±.1%, 1/10W	1074-0091	Dale	MF 1/10 T2
R4	Metal Film, 17.2Ω, ±.1%, 1/10W	1074-0088	Dale	MF 1/10 T2
R5	Metal Film, 135Ω, ±.1%, 1/10W	1074-0089	Dale	MF 1/10 T2
R6	Metal Film, 13.8Ω, ±.1%, 1/10W	1074-0087	Dale	MF 1/10 T2
R7	Metal Film, 135Ω, ±.1%, 1/10W	1074-0089	Dale	MF 1/10 T2
R8	Metal Film, 13.8Ω, ±.1%, 1/10W	1074-0087	Dale	MF 1/10 T2
R9	Metal Film, 75Ω, ±1±, 1/8W	1075-0035	Dale	MFF 1/8 T1
	TRANSFORMER			
T1	135Ω-600Ω Output	1576-0005	Cushman	





NOTE:
1. RESISTORS ±1% 1/8W VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.

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Figure 3-3. Impedance Selector. 1100

MAIN CHASSIS. 2000

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Assembly, Main Chassis	7007-0019	Cushman	
	Main Chassis	2275-0014	Cushman	
	CONNECTORS			
J1	Single row, 22-pin	2535-0018	Viking	2VK22S1-1
J2	Single row, 22-pin	2535-0018	Viking	2VK22S1-1
J3	Single row, 22-pin	2535-0018	Viking	2VK22S1-1
J4	Single row, 22-pin	2535-0018	Viking	2VK22S1-1
J5	Single row, 22-pin	2535-0018	Viking	2VK22S1-1
J6	Double row, 44-pin	2535-0023	Viking	2VK22D1-1
	TERMINAL BOARDS			
TB1	Grounding Wheel, #10 x 0.75 Dia.	3766-0018	Jan Engring	1001
TB2	Lug, #8, Solder	3766-0002	Cushman	
	FILTER			
FL1	RFI Line, 5 amp.	1040-0028	Corcom	5B1
	SOCKETS			
XQ1	TO-3 Outline, Power Transistor	2606-0003	Augat	8080-1G1
XQ2	TO-3 Outline, Power Transistor	2606-0003	Augat	8080-1G1
XQ3	TO-3 Outline, Power Transistor	2606-0003	Augat	8080-1G1
XQ4	TO-3 Outline, Power Transistor	2606-0003	Augat	8080-1G1
	TRANSFORMER			
T1	Power	1575-0009	Cushman	
	TRANSISTORS			
Q1	Si, NPN, Power Ampl.	1272-0041	RCA	2N3055
Q2	Si, NPN, Power Ampl.	1272-0041	RCA	2N3055
Q3	Si, NPN, Power Ampl.	1272-0041	RCA	2N3055
Q4	Si, NPN, Power Ampl.	1272-0041	RCA	2N3055

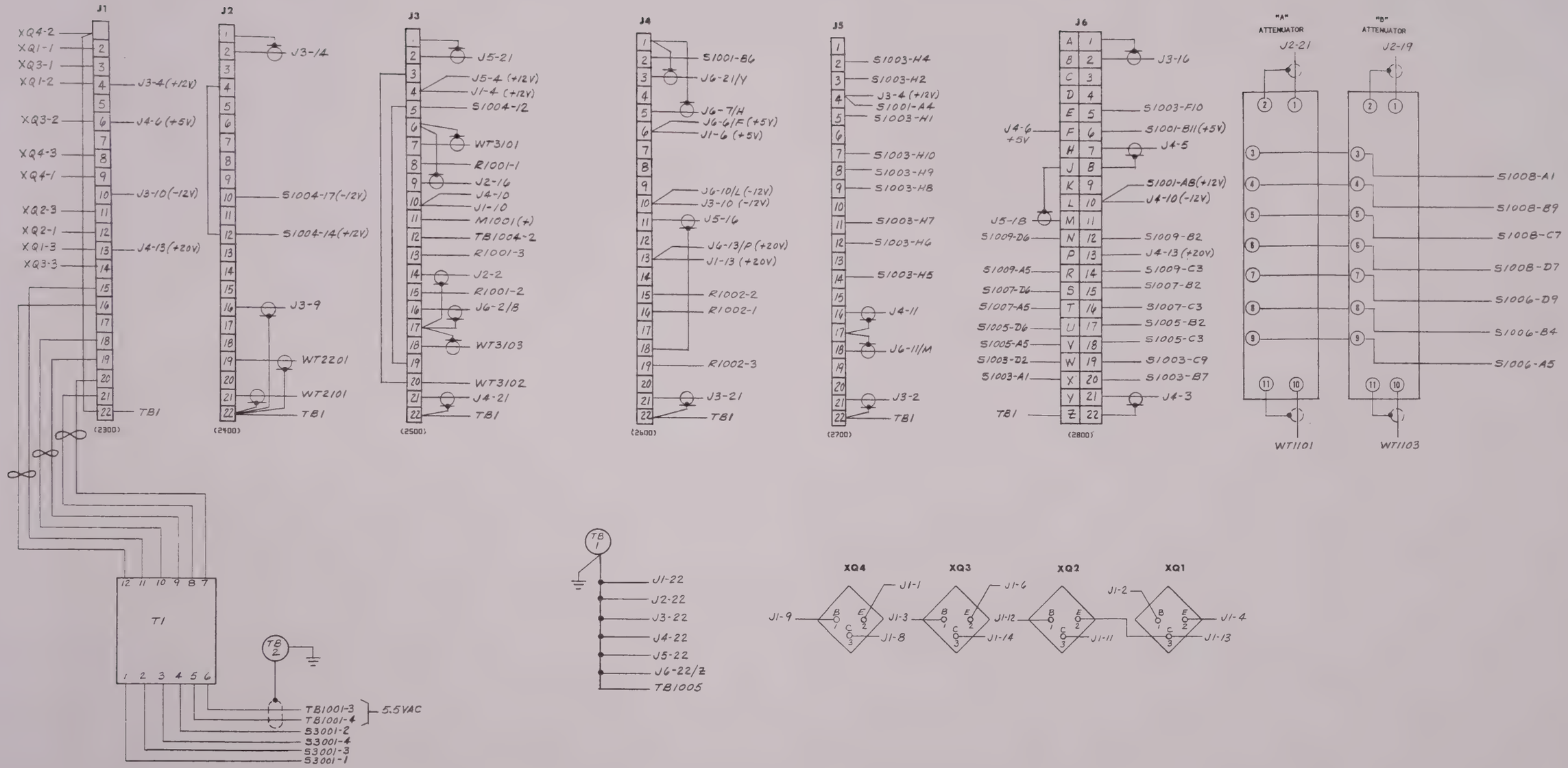
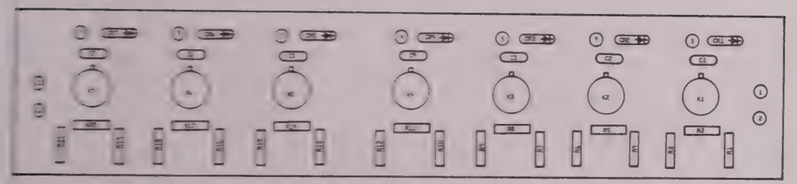


Figure 3-4. Main Chassis Interconnection Diagram. 2000

"A" ATTENUATOR. 2100

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	P.C. Board Assembly "A" Attenuator	7001-0104	Cushman	
	P.C. Board, "A" Attenuator	1780-0178	Cushman	
	CAPACITORS			
C1	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C2	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C3	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C4	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C5	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C6	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C7	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
	DIODES			
CR1	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR2	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR3	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR4	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR5	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR6	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR7	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
	RELAYS			
K1	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
K2	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
K3	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
K4	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
K5	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
K6	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
K7	DPDT, 12V (T0-5 CASE)	1313-0011	Cushman	
	RESISTORS			
R1	Metal Film, 1.305k, ±.25%, 1/10W	1074-0028	Dale	MF 1/10 T9
R2	Metal Film, 8.653Ω, .25%, 1/10W	1074-0001	IRC	T1
R3	Metal Film, 1.305k, ±.25%, 1/10W	1074-0028	Dale	MF 1/10 T9
R4	Metal Film, 654.4Ω, ±.25%, 1/10W	1074-0024	Dale	MF 1/10 T9
R5	Metal Film, 17.42Ω, ±.25%, 1/10W	1074-0002	IRC	T2
R6	Metal Film, 654.4Ω, ±.25%, 1/10W	1074-0024	Dale	MF 1/10 T9
R7	Metal Film, 331.5Ω, ±.25%, 1/10W	1074-0022	Dale	MF 1/10 T9
R8	Metal Film, 35.77Ω, ±.25%, 1/10W	1074-0003	Dale	MF 1/10 T9
R9	Metal Film, 331.5Ω, ±.25%, 1/10W	1074-0022	Dale	MF 1/10 T9
R10	Metal Film, 174.2Ω, ±.25%, 1/10W	1074-0019	Dale	MF 1/10 T9
R11	Metal Film, 79.27Ω, ±.25%, 1/10W	1074-0010	Dale	MF 1/10 T9
R12	Metal Film, 174.2Ω, ±.25%, 1/10W	1074-0019	Dale	MF 1/10 T9
R13	Metal Film, 144.4Ω, ±.1%, 1/10W	1074-0039	Dale	MF 1/10 T9
R14	Metal Film, 106.7Ω, ±.1%, 1/10W	1074-0038	Dale	MF 1/10 T9
R15	Metal Film, 144.4Ω, ±.1%, 1/10W	1074-0039	Dale	MF 1/10 T9
R16	Metal Film, 91.67Ω, ±.1%, 1/10W	1074-0037	Dale	MF 1/10 T9
R17	Metal Film, 371.3Ω, ±.1%, 1/10W	1074-0040	Dale	MF 1/10 T9
R18	Metal Film, 91.67Ω, ±.1%, 1/10W	1074-0037	Dale	MF 1/10
R19	Metal Film, 76.52Ω, ±.1%, 1/10W	1074-0036	Dale	MF 1/10 T9
R20	Metal Film, 3.75k, ±.1%, 1/10W	1074-0041	Dale	MF 1/10 T9
R21	Metal Film, 76.52Ω, ±.1%, 1/10W	1074-0036	Dale	MF 1/10 T9



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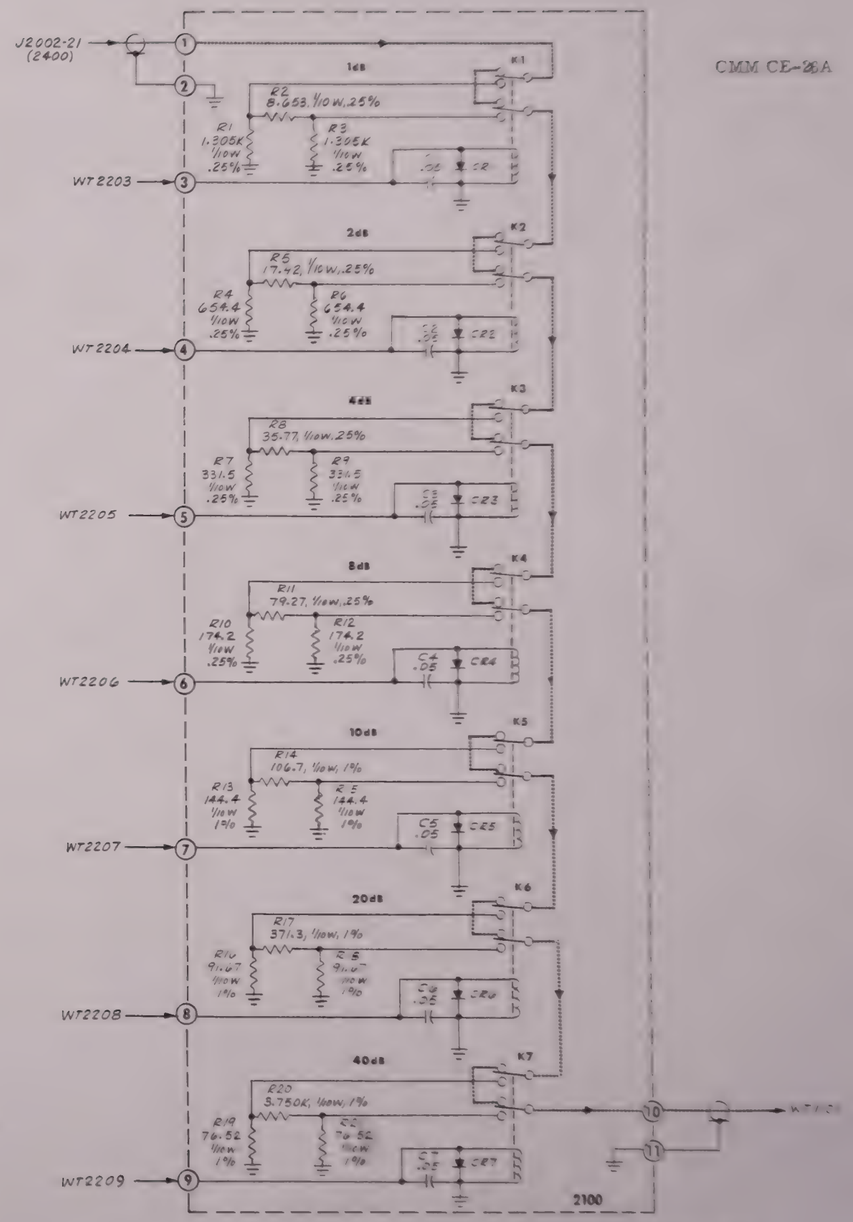


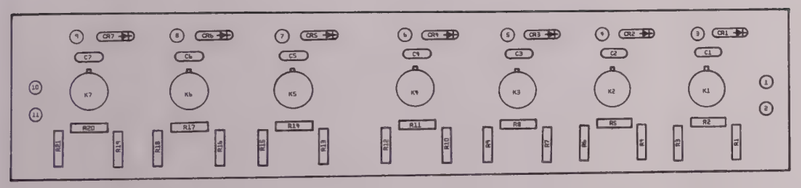
NOTE:

1. RESISTORS - 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.
6. ALL DIODES ARE 1N3064 UNLESS OTHERWISE NOTED.

Figure 3-5. "A" Attenuator. 2100

"B" ATTENUATOR. 2200

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	"B" Attenuator P.C. Board Assy.	7001-0105	Cushman	
	P.C. Board	1780-0179	Cushman	
	CAPACITORS			
C1	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C2	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C3	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C4	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C5	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C6	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C7	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
	DIODES			
CR1	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR2	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR3	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR4	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
CR5	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
	RELAYS			
K1	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
K2	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
K3	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
K4	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
K5	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
K6	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
K7	DPDT, 12V, (TO-5 CASE)	1313-0011	Cushman	
	RESISTORS			
R1	Metal Film, 1.305k, ±.25%, 1/10W	1074-0028	Dale	MF 1/10 T9
R2	Metal Film, 8.653Ω, ±.25%, 1/10W	1074-0001	I.R.C.	T1
R3	Metal Film, 1.305k, ±.25%, 1/10W	1074-0028	Dale	MF 1/10 T9
R4	Metal Film, 654.4Ω, ±.25%, 1/10W	1074-0024	Dale	MF 1/10 T9
R5	Metal Film, 17.42Ω, ±.25%, 1/10W	1074-0002	I.R.C.	T1
R6	Metal Film, 654.4Ω, ±.25%, 1/10W	1074-0024	Dale	MF 1/10 T9
R7	Metal Film, 331.5Ω, ±.25%, 1/10W	1074-0022	Dale	MF 1/10 T9
R8	Metal Film, 35.77Ω, ±.25%, 1/10W	1074-0003	Dale	MF 1/10 T9
R9	Metal Film, 331.5Ω, ±.25%, 1/10W	1074-0022	Dale	MF 1/10 T9
R10	Metal Film, 174.2Ω, ±.25%, 1/10W	1074-0019	Dale	MF 1/10 T9
R11	Metal Film, 79.27Ω, ±.25%, 1/10W	1074-0010	Dale	MF 1/10 T9
R12	Metal Film, 174.2Ω, ±.25%, 1/10W	1074-0019	Dale	MF 1/10 T9
R13	Metal Film, 144.4Ω, ±.1%, 1/10W	1074-0039	Dale	MF 1/10 T9
R14	Metal Film, 106.7Ω, ±.1%, 1/10W	1074-0038	Dale	MF 1/10 T9
R15	Metal Film, 144.4Ω, ±.1%, 1/10W	1074-0039	Dale	MF 1/10 T9
R16	Metal Film, 91.67Ω, ±.1%, 1/10W	1074-0037	Dale	MF 1/10 T9
R17	Metal Film, 371.3Ω, ±.1%, 1/10W	1074-0040	Dale	MF 1/10 T9
R18	Metal Film, 91.67Ω, ±.1%, 1/10W	1074-0037	Dale	MF 1/10 T9
R19	Metal Film, 76.52Ω, ±.1%, 1/10W	1074-0036	Dale	MF 1/10 T9
R20	Metal Film, 3.750k, ±.1%, 1/10W	1074-0041	Dale	MF 1/10 T9
R21	Metal Film, 76.52Ω, ±.1%, 1/10W	1074-0036	Dale	MF 1/10 T9



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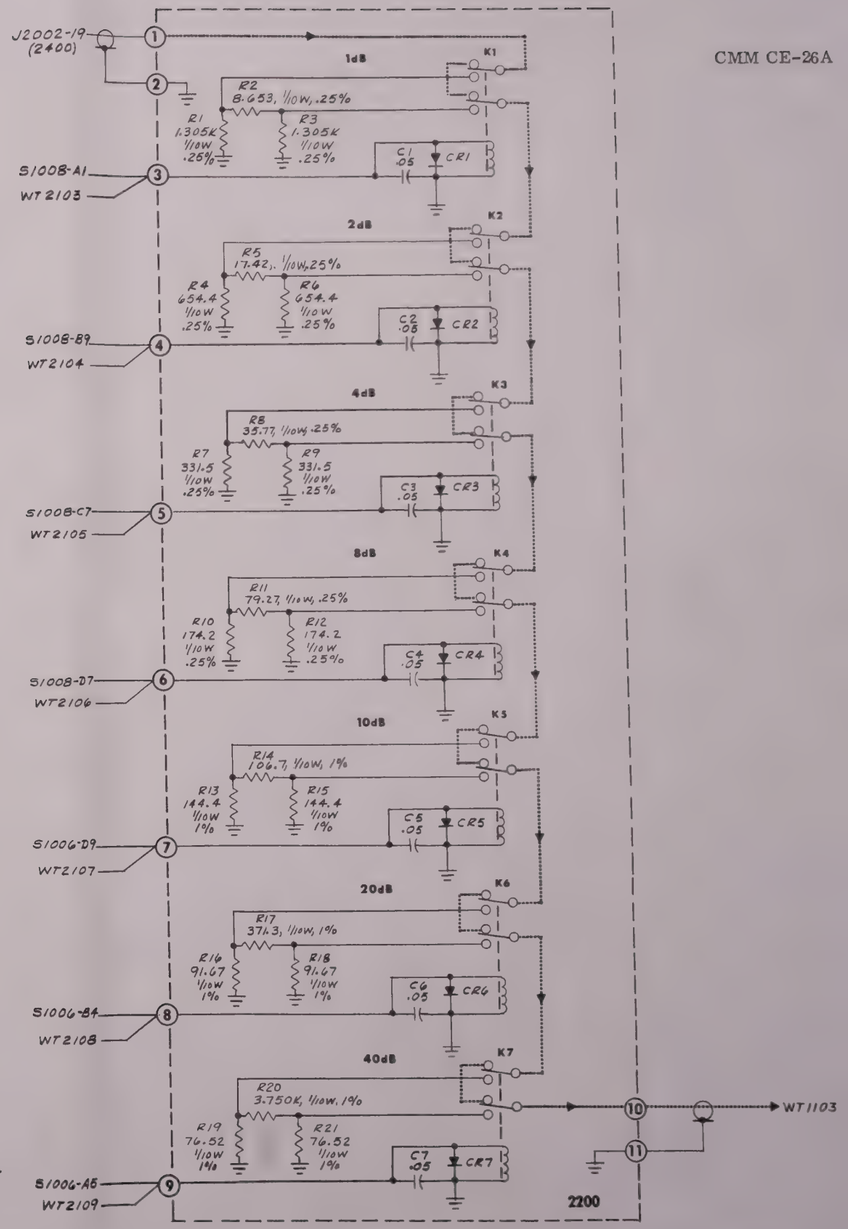


NOTE:

1. RESISTORS - 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.
6. ALL DIODES ARE 1N3064 UNLESS OTHERWISE NOTED.

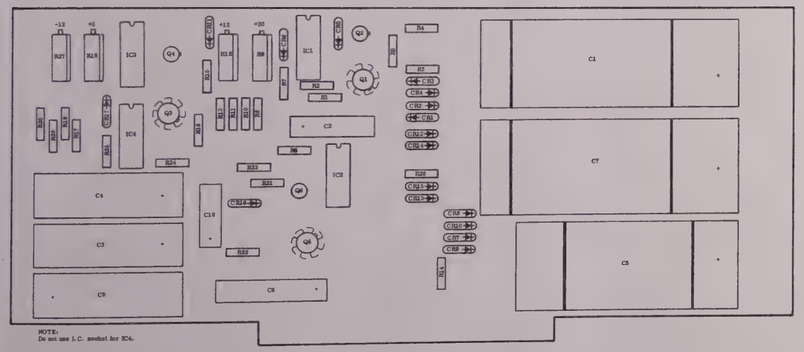
Figure 3-6. "B" Attenuator, 2200
3-21/3-22

POWER SUPPLY. 2300

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Power Supply P.C. Board Assy.	7001-0083	Cushman	
	P.C. Board	1780-0180	Cushman	
	CAPACITORS			
C1	Elect, 2300μF, 50V	1014-0004	Sprague	39D238G050JT5
C2	Elect, 10μF, +75-10%, 150V	1013-0017	Sprague	30D106G150DD5
C3	Elect, 200μF, 25V	1013-0013	Sprague	39D207G025EJ4
C4	Elect, 200μF, 25V	1013-0013	Sprague	39D207G025EJ4
C5	Elect, 4000μF, +75-10%, 25V	1014-0005	Sprague	39D408G025JS5
C6	Elect, 250μF, +75-10%, 16V	1013-0016	Sprague	30D257G016DF2
C7	Elect, 4700μF, +150-10%, 35V	1014-0018	Ill. Elna	35T4700
C8	Elect, 15μF, ±10%, 25V	1013-0005	Sprague	30D156G025BB5
C9	Elect, 200μF, 25V	1013-0013	Sprague	39D207G025EJ4
	DIODES			
CR1	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR2	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR3	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR4	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR5	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR6	Zener, 6.2V, 1N827	1281-0038	Transitron	1N827
CR7	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR8	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR9	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR10	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR11	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR12	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR13	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR14	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR15	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR16	Si, PIV, 1 amp, 100V	1281-0023	ITT	1N4002
CR17	Zener, 6.2V, 1N827	1281-0038	Transitron	1N827
	INTEGRATED CIRCUITS			
IC1	High Performance Op-Ampl.	2025-0022	T.I.	SN72741N
IC2	High Performance Op-Ampl.	2025-0022	T.I.	SN72741N
IC3	High Performance Op-Ampl.	2025-0022	T.I.	SN72741N
IC4	High Performance Op-Ampl.	2025-0022	T.I.	SN72741N
	RESISTORS			
R1	Comp, 3.9k, ±5%, 1/4W	1066-3925	Allen-Bradley	CB3925
R2	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R3	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R4	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R5	WW., 2.7Ω, ±5%, 3.25W	1180-0005	Ohmite	4341
R6	Comp, 1 Meg, ±5%, 1/4W	1066-1055	Allen-Bradley	CB1055
R7	Metal Film, 1.82k, ±1%, 1/8W	1075-0065	Dale	MFF 1/8 T1
R8	Metal Film, 2.74k, ±1%, 1/8W	1075-0071	Dale	MFF 1/8 T1
R9	Pot, 500Ω, ±10%, 3/4W	1212-0011	Helitrim	89WR
R10	Metal Film, 1k, ±1%, 1/8W	1075-0037	Dale	MFF 1/8 T1
R11	Metal Film, 4.113k, ±.25%, 1/10W	1074-0030	Dale	MF 1/10 T9
R12	Pot, 500Ω, ±10%, 3/4W	1215-0011	Helitrim	89WR
R13	Metal Film, 4.625k, ±.25%, 1/10W	1074-0031	Dale	MF 1/10 T9
R14	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R15	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025

POWER SUPPLY (cont). 2300

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
R16	WW., 1Ω, ±5%, 3W	1159-0001	Ohmite	4330
R17	Metal Film, 1.5k, ±1%, 1/8W	1075-0039	Dale	MFF 1/8 T1
R18	Pot, 500Ω, ±10%, 3/4W	1215-0011	Helitrim	89WR
R19	Metal Film, 4.5k, ±1%, 1/8W	1075-0066	Dale	MFF 1/8 T9
R20	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R21	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R22	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R23	WW., 1Ω, ±5%, 3W	1159-0001	Ohmite	4330
R24	Comp, 1 Meg, ±5%, 1/4W	1066-1055	Allen-Bradley	CB1055
R25	Comp, 820Ω, ±5%, 1/4W	1066-8215	Allen-Bradley	CB8215
R26	Metal Film, 2.74k, ±1%, 1/8W	1075-0071	Dale	MFF 1/8 T1
R27	Pot, 500Ω, ±10%, 3/4W	1215-0011	Helitrim	89WR
R28	Metal Film, 2.74k, ±1%, 1/8W	1075-0071	Dale	MFF 1/8 T1
	TRANSISTORS			
Q1	Si, NPN, 2N3053	1272-0011	RCA	2N3053
Q2	Si, NPN, 2N3053	1272-0011	RCA	2N3053
Q3	Si, NPN, 2N3053	1272-0011	RCA	2N3053
Q4	Si, NPN, 2N3053	1272-0011	RCA	2N3053
Q5	Si, NPN, 2N3053	1272-0011	RCA	2N3053
Q6	Si, NPN, 2N3053	1272-0011	RCA	2N3053



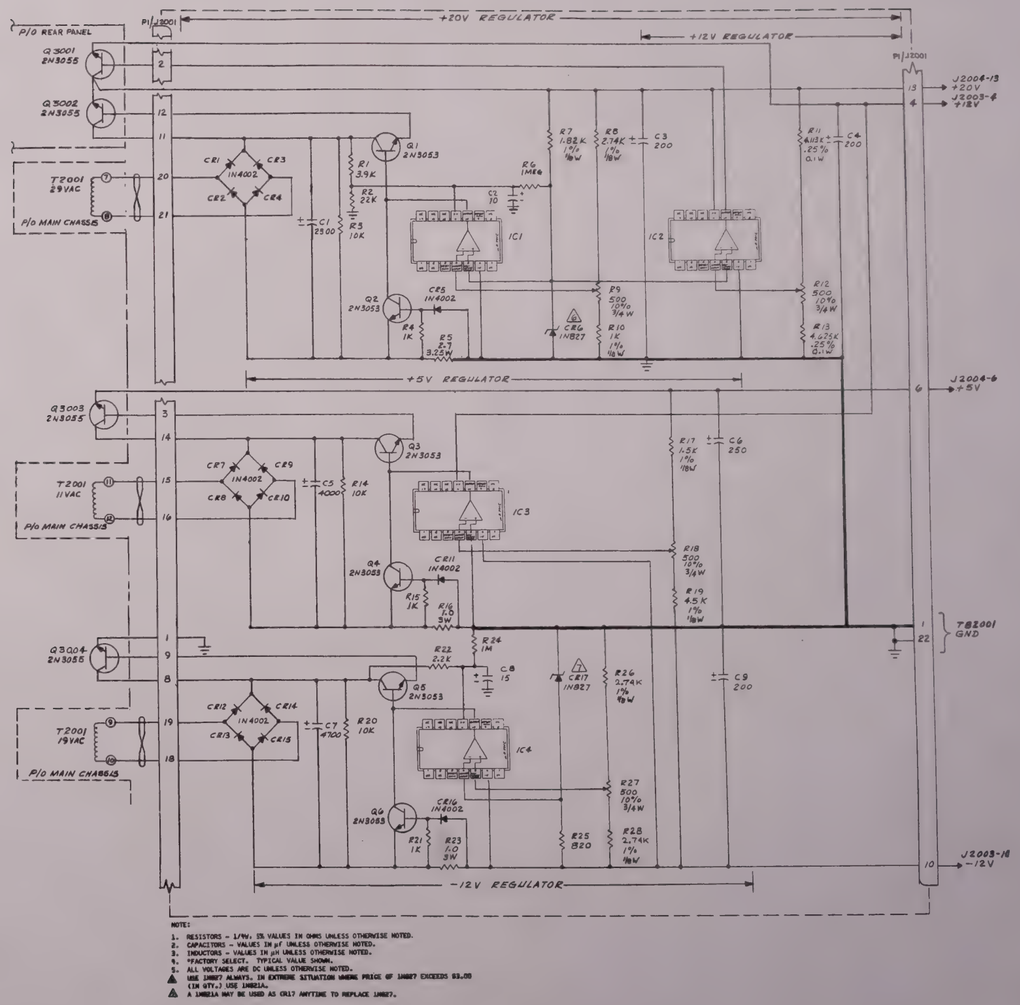


Figure 3-7. Power Supply. 2300

POWER AMPLIFIER. 2400

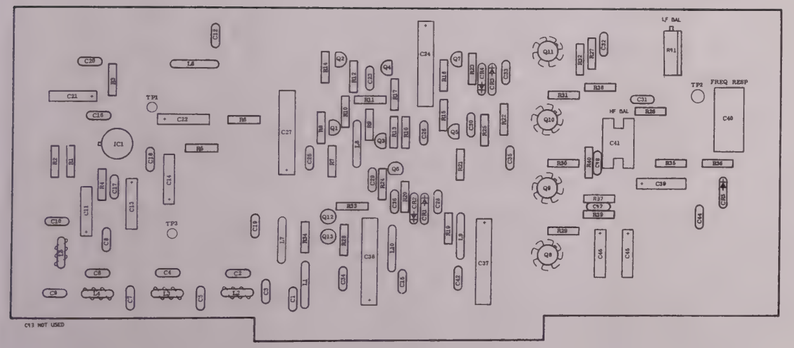
CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	P.C. Board Assy, Power Amplifier	7001-0084	Cushman	
	P.C. Board	1780-0181	Cushman	
	CAPACITORS			
C1	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C2	Mica, 18pF, ±5%, 500V	1002-0014	Elmenco	DM15-C-180J
C3	Mica, 180pF, ±5%, 500V	1002-0005	Elmenco	DM15-F-181J
C4	Mica, 100pF, ±5%, 500V	1002-0011	Elmenco	DM15-F-101J
C5	Mica, 330pF, ±5%, 500V	1002-0032	Elmenco	DM15-F-331J
C6	Mica, 150pF, ±5%, 500V	1002-0021	Elmenco	DM15-F-151J
C7	Mica, 270pF, ±5%, 500V	1002-0031	Elmenco	DM15-F-271J
C8	Mica, 68pF, ±5%, 500V	1002-0013	Elmenco	DM15-E-680J
C9	Mica, 270pF, ±5%, 500V	1002-0031	Elmenco	DM15-F-271J
C10	Mica, 120pF, ±5%, 500V	1002-0010	Elmenco	DM15-F-121J
C11	Elect, 1μF, ±10%, 25V	1013-0004	Sprague	30D105G025BA5
C12	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C13	Elect, 1μF, ±10%, 25V	1013-0004	Sprague	30D105G025BA5
C14	Elect, 15μF, ±10%, 12V	1013-0015	Sprague	30D156G012BA5
C15	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C16	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C17	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C18	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C19	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C20	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C21	Elect, 15μF, ±10%, 12V	1013-0015	Sprague	30D156G012BA5
C22	Elect, 1μF, ±10%, 25V	1013-0004	Sprague	30D105G025BA5
C23	Mica, 68pF, ±5%, 500V	1002-0013	Elmenco	DM15-E-680J
C24	Elect, 100μF, ±10%, 25V	1013-0003	Sprague	30D107G025DO5
C25	Cer, .05μF, ±10%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C26	Cer, .05μF, ±10%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C27	Elect, 100μF, ±10%, 25V	1013-0003	Sprague	30D107G025DO5
C28	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C29	Mica, 10pF, ±5%, 500V	1002-0016	Elmenco	D15-C-100J
C30	Mica, 22pF, ±5%, 500V	1002-0023	Elmenco	DM15-C-220J
C31	Cer, 1.2pF, ±.1%, 500V	1005-0016	Erie	301-C0K-129B
C32	Cer, 1.2pF, ±.1%, 500V	1005-0016	Erie	301-C0K-129B
C33	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C34	Mica, 100pF, ±5%, 500V	1002-0011	Elmenco	DM15-F-101J
C35	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C36	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C37	Elect, 100μF, ±10%, 25V	1013-0003	Sprague	30D107G025D05
C38	Elect, 100μF, ±10%, 25V	1013-0003	Sprague	30D107G025D05
C39	Elect, 1.5μF, ±10%, 35V	1013-0001	Sprague	150D155X9035B2
C40	Var, .8-12pF, 750V	1001-0007	J.F.D.	VC-31 GWY
C41	Var, 1.7-14.1pF, 250V	1000-0011	E.F. Johnson	189-755-5
C42	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C43	Not Used			
C44	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C45	Tant, 22μF, ±10%, 15V	1011-0003	Sprague	150D226X9015B2
C46	Tant, 22μF, ±10%, 15V	1011-0003	Sprague	150D226X9015B2
C47	Mica, 100pF, ±5%, 500V	1002-0011	Elmenco	DM15-F-101J
C48	Mica, 100pF, ±5%, 500V	1002-0011	Elmenco	DM15-F-101J

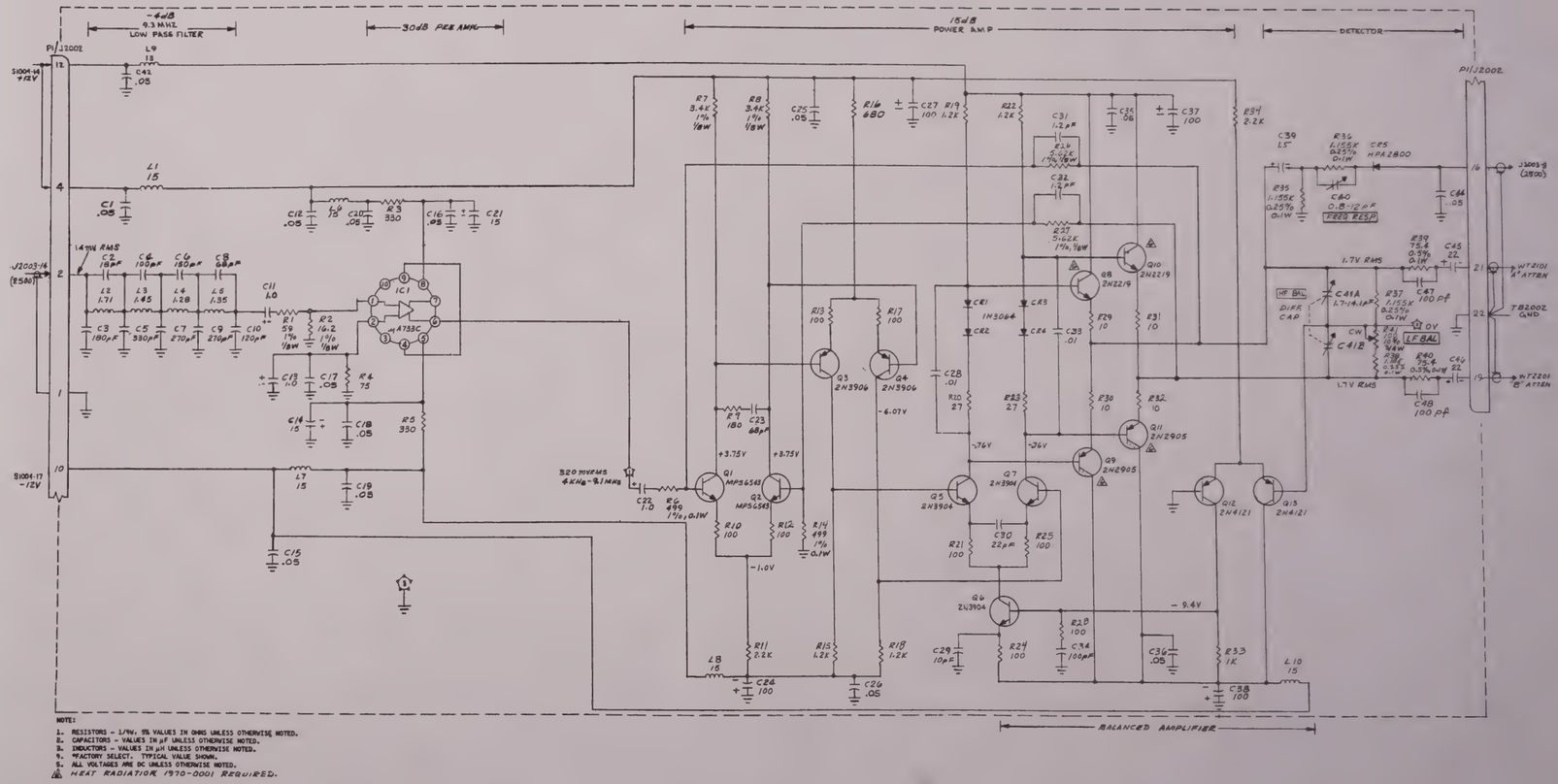
POWER AMPLIFIER (cont). 2400

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	COILS			
L1	RF Choke, 15μH, ±10%	1585-0034	Delevan	1537-40
L2	Toroid, 1.71μH	1579-0020-04	Cushman	
L3	Toroid, 1.45μH	1579-0020-03	Cushman	
L4	Toroid, 1.28μH	1579-0020-01	Cushman	
L5	Toroid, 1.35μH	1579-0020-02	Cushman	
L6	RF Choke, 15μH, ±10%	1585-0034	Delevan	1537-40
L7	RF Choke, 15μH, ±10%	1585-0034	Delevan	1537-40
L8	RF Choke, 15μH, ±10%	1585-0034	Delevan	1537-40
L9	RF Choke, 15μH, ±10%	1585-0034	Delevan	1537-40
L10	RF Choke, 15μH, ±10%	1585-0034	Delevan	1537-40
	DIODES			
CR1	Si, 1N3064	1281-0013	Teledyne	1N3064
CR2	Si, 1N3064	1281-0013	Teledyne	1N3064
CR3	Si, 1N3064	1281-0013	Teledyne	1N3064
CR4	Si, 1N3064	1281-0013	Teledyne	1N3064
CR5	Si, Hot Carrier, HPA 2800	1283-0001	HPA	5082-2800
	INTEGRATED CIRCUITS			
IC1	Video Ampl, μA733C	2025-0025	Fairchild	U5F7733393
	RESISTORS			
R1	Metal Film, 59Ω, ±1%, 1/8W	1075-0067	Dale	MFF 1/8 T1
R2	Metal Film 16.2Ω, ±1%, 1/8W	1075-0068	Dale	MFF 1/8 T1
R3	Comp, 330Ω, ±5%, 1/4W	1066-3315	Allen-Bradley	CB3315
R4	Comp, 75Ω, ±5%, 1/4W	1066-7505	Allen-Bradley	CB7505
R5	Comp, 330Ω, ±5%, 1/4W	1066-3315	Allen-Bradley	CB3315
R6	Metal Film, 499Ω, ±1%, 1/10W	1075-0008	Dale	MF 1/10 T1
R7	Metal Film, 3.4k, ±1%, 1/8W	1075-0020	Dale	MFF 1/8 T1
R8	Metal Film, 3.4k, ±1%, 1/8W	1075-0020	Dale	MFF 1/8 T1
R9	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R10	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R11	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R12	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R13	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R14	Metal Film, 499Ω, ±1%, 1/10W	1075-0008	Dale	MF 1/10 T1
R15	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R16	Comp, 680Ω, ±5%, 1/4W	1066-6815	Allen-Bradley	CB6815
R17	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R18	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R19	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R20	Comp, 27Ω, ±5%, 1/4W	1066-2705	Allen-Bradley	CB2705
R21	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R22	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R23	Comp, 27Ω, ±5%, 1/4W	1066-2705	Allen-Bradley	CB2705
R24	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R25	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R26	Metal Film, 5.62k, ±1%, 1/8W	1075-0013	Dale	MFF 1/8 T1
R27	Metal Film, 5.62k, ±1%, 1/8W	1075-0013	Dale	MFF 1/8 T1
R28	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R29	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R30	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R31	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R32	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R33	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R34	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R35	Metal Film, 1.155k, ±.25%, 1/10W	1074-0027	Dale	MF 1/10 T9

POWER AMPLIFIER (cont). 2400

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
R36	Metal Film, 1.155k, ±.25%, 1/10W	1074-0027	Dale	MF 1/10 T9
R37	Metal Film, 1.155k, ±.25%, 1/10W	1074-0027	Dale	MF 1/10 T9
R38	Metal Film, 1.111k, ±25%, 1/10W	1074-0026	Dale	MF 1/10 T9
R39	Metal Film, 75.4Ω, ±.5%, 1/10W	1074-0009	Dale	MF 1/10 T9
R40	Metal Film, 75.4Ω, ±.5%, 1/10W	1074-0009	Dale	MF 1/10 T9
R41	Pot, 100Ω, ±10%, 3/4W	1215-0010	Helitrim	89WR
	TRANSISTORS			
Q1	Si, NPN, MPS6543	1271-0008	Motorola	MPS-6543
Q2	Si, NPN, MPS6543	1271-0008	Motorola	MPS-6543
Q3	Si, NPN, 2N3906	1272-0037	Motorola	2N3906
Q4	Si, NPN, 2N3906	1272-0037	Motorola	2N3906
Q5	Si, NPN, 2N3904	1272-0032	Motorola	2N3904
Q6	Si, NPN, 2N3904	1272-0032	Motorola	2N3904
Q7	Si, NPN, 2N3904	1272-0032	Motorola	2N3904
Q8	Si, NPN, 2N2219	1272-0036	Fairchild	2N2219
Q9	Si, PNP, 2N2905	1272-0035	Motorola	2N2905
Q10	Si, NPN, 2N2219	1272-0036	Fairchild	2N2219
Q11	Si, PNP, 2N2905	1272-0035	Motorola	2N2905
Q12	Si, PNP, 2N4121	1272-0023	Fairchild	2N4121
Q13	Si, PNP, 2N4121	1272-0023	Fairchild	2N4121





NOTE:
1. RESISTORS - 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.
⚠ HEAT RADIATOR 1970-0001 REQUIRED.

Figure 3-8. Power Amplifier. 2400

R.F. CIRCUITS. 2500

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	R.F., P.C. Board Assy.	7001-0085	Cushman	
	P.C. Board	1780-0182	Cushman	
	CAPACITORS			
C1	Cer, .01μF, ±10%, 100V	1005-0065	Aerovox	CK06BX103K
C2	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C3	Cer, .01μF, ±10%, 100V	1005-0065	Aerovox	CK06BX103K
C4	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C5	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C6	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C7	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C8	Mica, 300pF, ±5%, 500V	1002-0059	Elmenco	DM15-301J
C9	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C10	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C11	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C12	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C13	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C14	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C15	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C16	Cer, .01μF, ±10%, 100V	1005-0065	Aerovox	CK06BX103K
C17	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C18	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C19	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C20	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C21	Mica, 820pF, ±5%, 300V	1002-0039	Elmenco	DM15-F-821J
C22	Elect, 15μF, +75-10%, 12V	1013-0015	Sprague	30D156G012BA5
C23	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C24	Mica, 470pF, ±5%, 500V	1002-0035	Elmenco	DM15-F-471J
C25	Not Used			
C26	Mica, 200pF, ±5%, 500V	1002-0042	Elmenco	DM15-F-201J
C27	Mica, 330pF, ±5%, 500V	1002-0032	Elmenco	DM15-F-331J
C28	Mica, 200pF, ±5%, 500V	1002-0042	Elmenco	DM15-F-201J
C29	Not Used			
C30	Cer, .01μF, ±10%, 100V	1005-0065	Aerovox	CO06BX103K
C31	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C32	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C33	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C34	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C35	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C36	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C37	Cer, .047μF, +10%, 100V	1005-0055	Aerovox	CK06BX473K
C38	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C39	Cer, .01μF, ±10%, 100V	1005-0065	Aerovox	CK06BX103K
C40	Elect, 100μF, +75-10%, 12V	1013-0011	Sprague	30D107G012CC5
C41	Elect, 1.5μF, ±10%, 35V	1013-0001	Sprague	150D155X9035B2
C42	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C43	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C44	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C45	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C46	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C47	Mica, 5000pF, ±5%, 500V	1002-0075	Elmenco	DM19-F-502J
C48	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C49	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C50	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K

RF CIRCUITS (cont). 2500

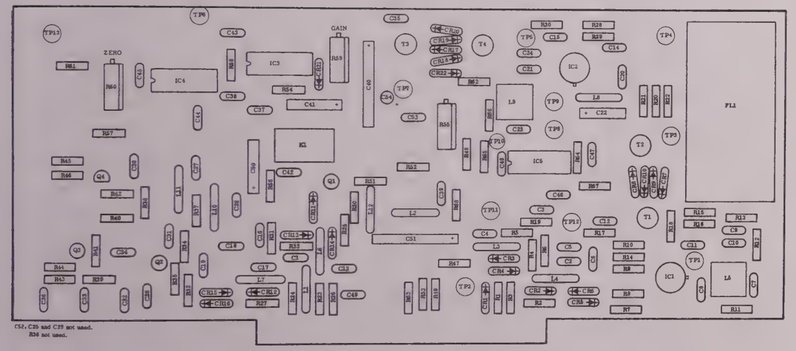
CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
C51	Elect, 100μF, ±10%, 25V	1013-0003	Sprague	30D107G025DD5
C52	Not Used			
C53	Cer, .047μF, ±10%, 100V	1005-0055	Aerovox	CK06BX473K
C54	Tant, 10μF, +50-20%, 35V	1011-0006	ITT	TAG 10/35-20
	COILS			
L1	RF Choke, 47μH, ±5%	1585-0010	Delevan	1537-60
L2	RF Choke, 47μH, ±5%	1585-0010	Delevan	1537-60
L3	RF Choke, 82μH, ±5%	1585-0032	Delevan	1537-72
L4	RF Choke, 82μH, ±5%	1585-0032	Delevan	1537-72
L5	Var, .5-.75μH	1596-0011	Cushman	
L6	RF Choke, 82μH, ±5%	1585-0032	Delevan	1537-72
L7	RF Choke, 82μH, ±5%	1585-0032	Delevan	1537-72
L8	RF Choke, 15μH, ±5%	1585-0034	Delevan	1537-40
L9	Var, .5-.75μH	1596-0011	Cushman	
L10	RF Choke, .47μH, ±20%	1585-0031	Delevan	1537-06
L11	RF Choke, .47μH, ±20%	1585-0031	Delevan	1537-06
L12	RF Choke, 47μH, ±5%	1585-0010	Delevan	1537-60
	DIODES			
CR1	Si, 1N3064	1281-0013	Teledyne	1N3064
CR2	Si, 1N3064	1281-0013	Teledyne	1N3064
CR3	Si, 1N3064	1281-0013	Teledyne	1N3064
CR4	Si, 1N3064	1281-0013	Teledyne	1N3064
CR5	Si, 1N3064	1281-0013	Teledyne	1N3064
CR6	Si, 1N3064	1281-0013	Teledyne	1N3064
CR7	Si, HPA 2800	1283-0001	HPA	5082-2800
CR8	Si, HPA 2800	1283-0001	HPA	5082-2800
CR9	Si, HPA 2800	1283-0001	HPA	5082-2800
CR10	Si, HPA 2800	1283-0001	HPA	5082-2800
CR11	Si, 1N3064	1281-0013	Teledyne	1N3064
CR12	Si, 1N3064	1281-0013	Teledyne	1N3064
CR13	Si, 1N3064	1281-0013	Teledyne	1N3064
CR14	Si, 1N3064	1281-0013	Teledyne	1N3064
CR15	Si, 1N3064	1281-0013	Teledyne	1N3064
CR16	Si, 1N3064	1281-0013	Teledyne	1N3064
CR17	Si, HPA 2800	1283-0001	HPA	5082-2800
CR18	Si, HPA 2800	1283-0001	HPA	5082-2800
CR19	Si, HPA 2800	1283-0001	HPA	5082-2800
CR20	Si, HPA 2800	1283-0001	HPA	5082-2800
CR21	Si, HPA 2800	1283-0001	HPA	5082-2800
CR22	Si, G633	1282-0005	ITT	G633
	FILTER			
FL1	11.9995 MHz Crystal	1040-0017	Cushman	
	INTEGRATED CIRCUITS			
IC1	Transistor Array CA3018	2025-0031	RCA	CA3018
IC2	RF Ampl, CA3028A	2025-0012	RCA	CA3028A
IC3	High Performance Op. Ampl.	2025-0022	T.I.	SN72741N
IC4	High Performance Op. Ampl.	2025-0022	T.I.	SN72741N
IC5	High Performance Op. Ampl.	2025-0022	T.I.	SN72721N

RF CIRCUITS (cont). 2500

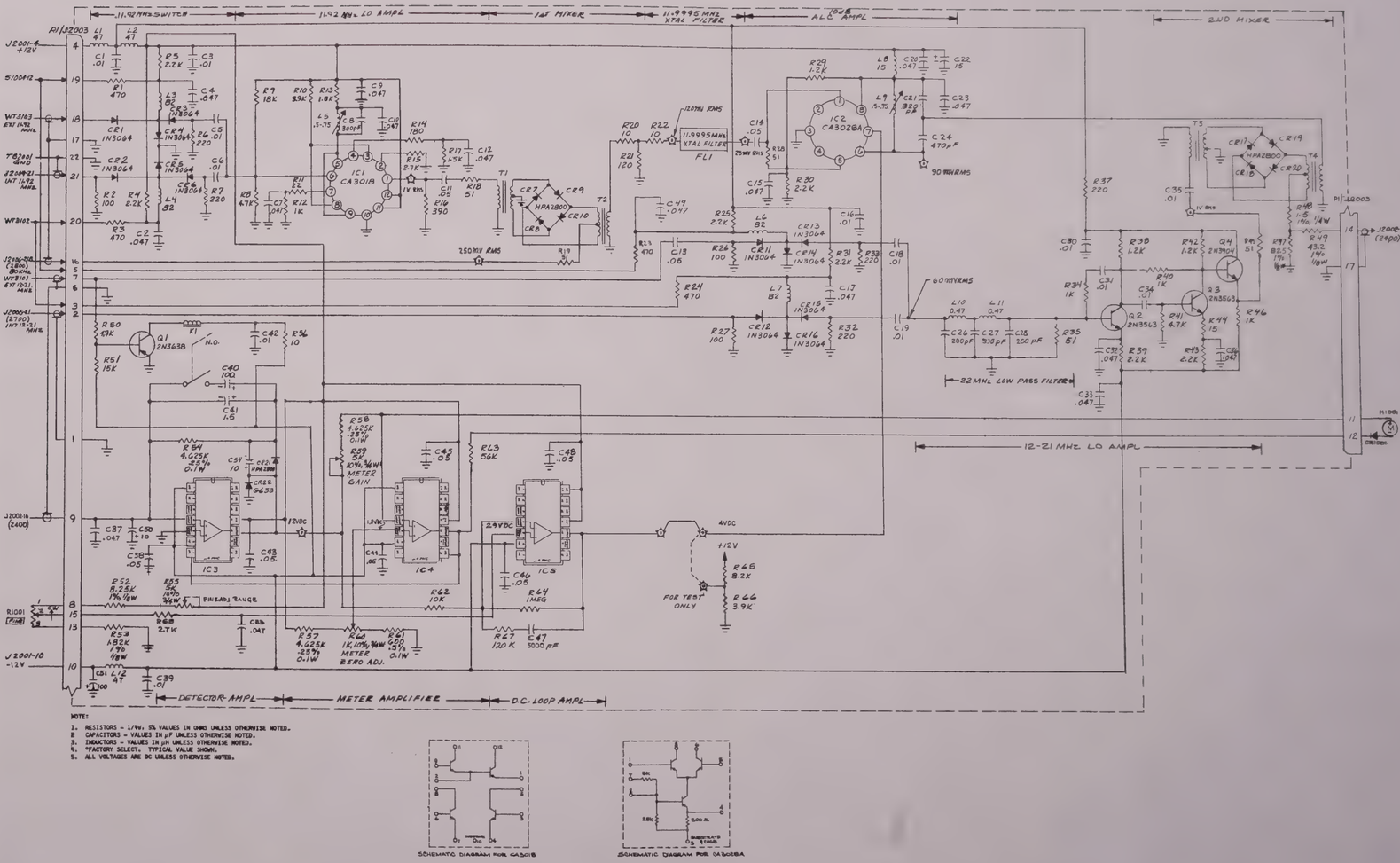
CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	RELAY			
K1	2 PDT, Reed	1313-0007	Elec-Trol	RA30382051
	RESISTORS			
R1	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R2	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R3	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R4	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R5	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R6	Comp, 220Ω, ±5%, 1/4W	1066-2215	Allen-Bradley	CB2215
R7	Comp, 220Ω, ±5%, 1/4W	1066-2215	Allen-Bradley	CB2215
R8	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R9	Comp, 18k, ±5%, 1/4W	1066-1835	Allen-Bradley	CB1835
R10	Comp, 3.9k, ±5%, 1/4W	1066-3925	Allen-Bradley	CB3925
R11	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R12	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R13	Comp, 1.8k, ±5%, 1/4W	1066-1825	Allen-Bradley	CB1825
R14	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R15	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R16	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R17	Comp, 1.5k, ±5%, 1/4W	1066-1525	Allen-Bradley	CB1525
R18	Comp, 51Ω, ±5%, 1/4W	1066-5105	Allen-Bradley	CB5105
R19	Comp, 51Ω, ±5%, 1/4W	1066-5105	Allen-Bradley	CB5105
R20	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R21	Comp, 120Ω, ±5%, 1/4W	1066-1215	Allen-Bradley	CB1215
R22	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R23	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R24	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R25	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R26	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R27	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R28	Comp, 51Ω, ±5%, 1/4W	1066-5105	Allen-Bradley	CB5105
R29	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R30	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R31	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R32	Comp, 220Ω, ±5%, 1/4W	1066-2215	Allen-Bradley	CB2215
R33	Comp, 220Ω, ±5%, 1/4W	1066-2215	Allen-Bradley	CB2215
R34	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R35	Comp, 51Ω, ±5%, 1/4W	1066-5105	Allen-Bradley	CB5105
R36	Not Used			
R37	Comp, 220Ω, ±5%, 1/4W	1066-2215	Allen-Bradley	CB2215
R38	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R39	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R40	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R41	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R42	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R43	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R44	Comp, 15Ω, ±5%, 1/4W	1066-1505	Allen-Bradley	CB1505
R45	Comp, 51Ω, ±5%, 1/4W	1066-5105	Allen-Bradley	CB5105
R46	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R47	Metal Film, 82.5Ω, ±1%, 1/8W	1075-0106	Dale	MFF 1/8 T1
R48	Metal Film, 1.5Ω, ±1%, 1/4W	1077-0001	IRC	TF07
R49	Metal Film, 43.2Ω, ±1%, 1/8W	1075-0069	Dale	MFF 1/8 T1
R50	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725

RF CIRCUITS (cont). 2500

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
R51	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R52	Metal Film, 8.25k, ±1%, 1/8W	1075-0014	Dale	MFF 1/8 T1
R53	Metal Film, 1.82k, ±1%, 1/8W	1075-0065	Dale	MFF 1/8 T1
R54	Metal Film, 4.625k, .25%, 1/10W	1074-0031	Dale	MF 1/10 T9
R55	Pot, 5k, ±10%, 3/4W	1215-0012	Helitrim	89WR
R56	Comp, 10Ω, ±5%, 1/4W	1066-1005	Allen-Bradley	CB1005
R57	Metal Film, 4.625k, .25%, 1/10W	1074-0031	Dale	MF 1/10 T9
R58	Metal Film, 4.625k, .25%, 1/10W	1074-0031	Dale	MF 1/10 T9
R59	Pot, 5k, ±10%, 3/4W	1215-0012	Helitrim	89WR
R60	Pot, 1k, ±10%, 3/4W	1215-0013	Helitrim	89WR
R61	Comp, 600Ω, ±.5%, 1/10W	1074-0023	Dale	MF 1/10 T9
R62	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R63	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R64	Comp, 1 Meg	1066-1055	Allen-Bradley	CB1055
R65	Comp, 8.2k, ±5%, 1/4W	1066-8225	Allen-Bradley	CB8225
R66	Comp, 3.9k, ±5%, 1/4W	1066-3925	Allen-Bradley	CB3925
R67	Comp, 120k, ±5%, 1/4W	1066-1245	Allen-Bradley	CB1245
R68	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
	TRANSFORMERS			
T1	Trifilar Coil	1579-0017	Cushman	
T2	Trifilar Coil	1579-0017	Cushman	
T3	Trifilar Coil	1579-0017	Cushman	
T4	Trifilar Coil	1579-0017	Cushman	
	TRANSISTORS			
Q1	Si, PNP, 2N3638	1272-0015	Fairchild	2N3638
Q2	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q3	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q4	Si, NPN, 2N3904	1272-0032	Fairchild	2N3904



C51, C55 and C59 not used.
R36 not used.



NOTE:

1. RESISTORS - 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.

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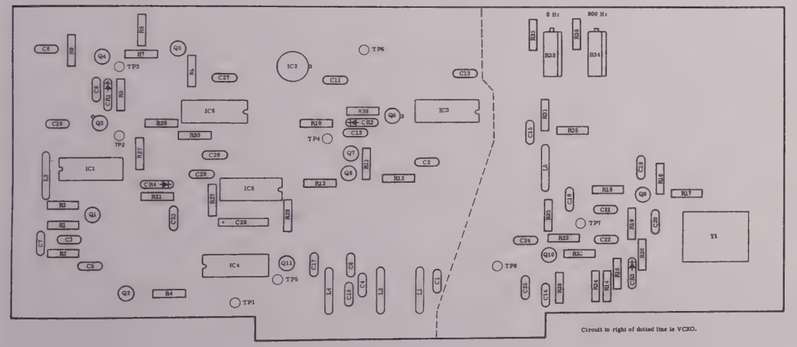
Figure 3-9. R. F. Circuits. 2500

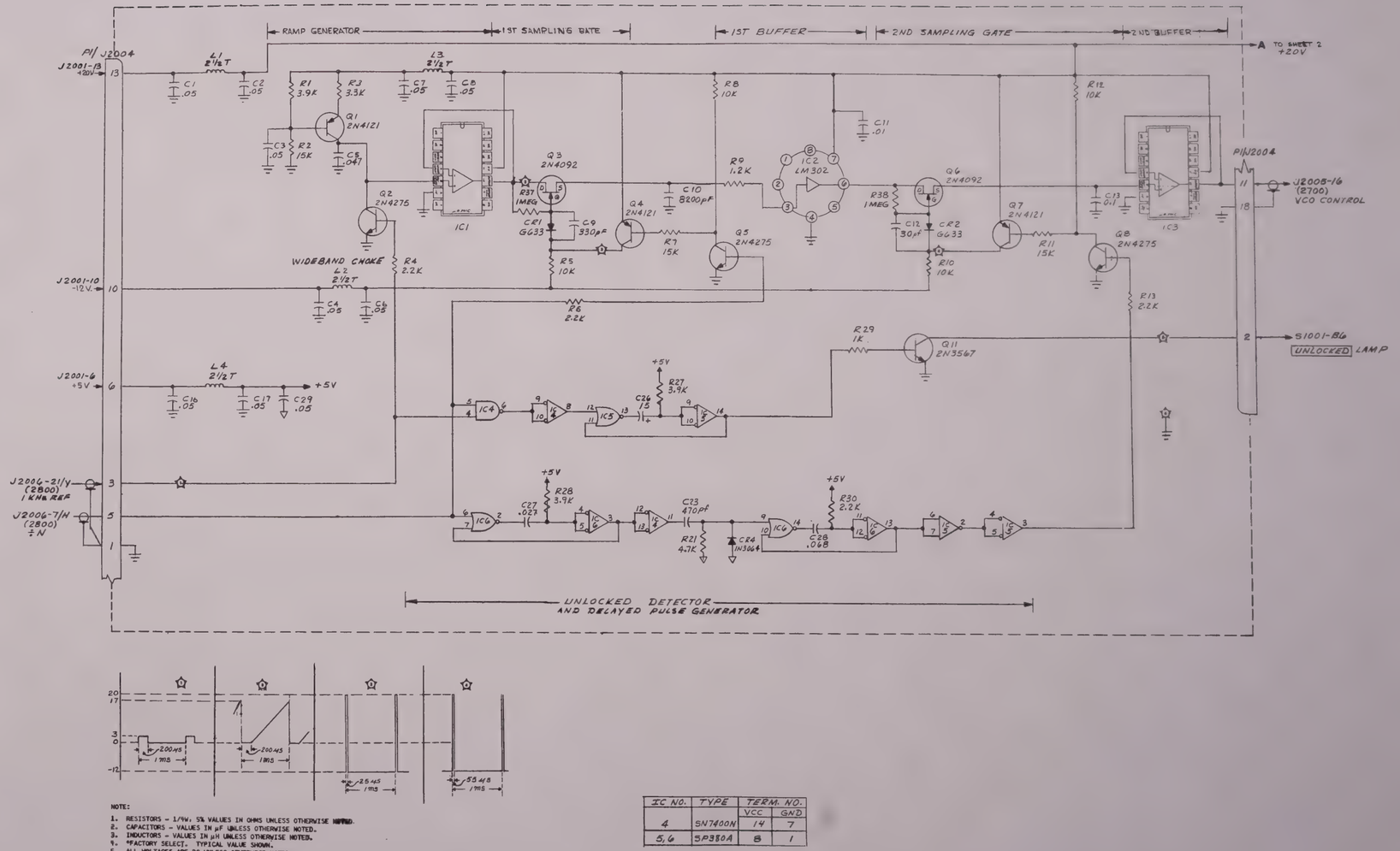
SAMPLE AND HOLD. 2600

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Sample and Hold P.C. Board Assy.	7001-0086	Cushman	
	P.C. Board	1780-0183	Cushman	
	CAPACITORS			
C1	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C2	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C3	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C4	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C5	Poly, .047μF, ±10%, 100V	1008-0049	Sprague	225P47391WA3
C6	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C7	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C8	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C9	Mica, 330pF, ±5%, 500V	1002-0032	Elmenco	DM15-F-331J
C10	Mica, 8200pF, ±5%, 100V	1002-0076	Elmenco	DM19-822J
C11	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C12	Mica, 30pF, ±5%, 500V	1002-0043	Elmenco	DM15-E-300J
C13	Poly, .1μF, ±10%, 100V	1008-0031	Sprague	225P10491
C14	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C15	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C16	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C17	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C18	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C19	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C20	Mica, 150pF, ±5%, 500V	1002-0021	Elmenco	DM15-F-151J
C21	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C22	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C23	Mica, 470pF, ±5%, 500V	1002-0035	Elmenco	DM15-F-471J
C24	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C25	Cer, .01μF, +80-20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C26	Elect, 15μF, +75-10%, 12V	1013-0015	Sprague	30D156G012BA5
C27	Poly, .027μF, ±10%, 100V	1008-0032	Sprague	225P27391
C28	Poly, .068μF, ±10%, 100V	1008-0036	Sprague	225P68391WA3
C29	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
	COILS			
L1	RF Choke, 2 1/2 turns, Wide Band	1586-0003	Ferroxcube	VK20020/4B
L2	RF Choke, 2 1/2 turns, Wide Band	1586-0003	Ferroxcube	VK20020/4B
L3	RF Choke, 2 1/2 turns, Wide Band	1586-0003	Ferroxcube	VK20020/4B
L4	RF Choke, 2 1/2 turns, Wide Band	1586-0003	Ferroxcube	VK20020/4B
L5	RF Choke, 100μH, ±5%	1585-0017	Delevan	1537-76
	CRYSTAL			
Y1	Crystal, 11.919 MHz	2035-0017	Cushman	
	DIODES			
CR1	Signal, G633	1282-0005	ITT	G633
CR2	Signal, G633	1282-0005	ITT	G633
CR3	Varicap, ±5%, V947B	1281-0019	TRW	V947B
CR4	Si, Signal, 75 PIV	1281-0013	Teledyne	1N3064
	INTEGRATED CIRCUITS			
IC1	High Performance Op-Ampl.	2025-0022	T.I.	SN72741N
IC2	Voltage Follower	2025-0029	Fairchild	LM302
IC3	High Performance Op-Ampl.	2025-0022	T.I.	SN72741N
IC4	TTL Nand Gates	2025-0003	T.I.	SN7400N
IC5	Quad, 2-input Nor	2025-0019	Signetics	SP380A
IC6	Quad, 2-input Nor	2025-0019	Signetics	SP380A

SAMPLE AND HOLD (cont). 2600

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	RESISTORS			
R1	Comp, 3.9k, ±5%, 1/4W	1066-3925	Allen-Bradley	CB3925
R2	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R3	Comp, 3.3k, ±5%, 1/4W	1066-3325	Allen-Bradley	CB3325
R4	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R5	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R6	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R7	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R8	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R9	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R10	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R11	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R12	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R13	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R14	Comp, 5.6 Meg, ±5%, 1/4W	1066-5655	Allen-Bradley	CB5655
R15	Comp, 100k, ±5%, 1/4W	1066-1045	Allen-Bradley	CB1045
R16	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R17	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R18	Comp, 3.3k, ±5%, 1/4W	1066-3325	Allen-Bradley	CB3325
R19	Comp, 6.8k, ±5%, 1/4W	1066-6825	Allen-Bradley	CB6825
R20	Comp, 330Ω, ±5%, 1/4W	1066-3315	Allen-Bradley	CB3315
R21	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R22	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R23	Comp, 18Ω, ±5%, 1/4W	1066-1805	Allen-Bradley	CB1805
R24	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R25	Comp, 3.3k, ±5%, 1/4W	1066-3325	Allen-Bradley	CB3325
R26	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R27	Comp, 3.9k, ±5%, 1/4W	1066-3925	Allen-Bradley	CB3925
R28	Comp, 3.9k, ±5%, 1/4W	1066-3925	Allen-Bradley	CB3925
R29	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R30	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R31	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R32	Pot, 1k, ±10%, 3/4W	1215-0013	Helitrim	89WR
R33	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R34	Pot, 1k, ±10%, 3/4W	1215-0013	Helitrim	89WR
R35	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R36	Comp, 680Ω, ±5%, 1/4W	1066-6815	Allen-Bradley	CB6815
R37	Comp, 1 Meg, ±5%, 1/4W	1066-1055	Allen-Bradley	CB1055
R38	Comp, 1 Meg, ±5%, 1/4W	1066-1055	Allen-Bradley	CB1055
	TRANSISTORS			
Q1	Si, PNP, 2N4121	1272-0023	Fairchild	2N4121
Q2	Si, NPN, 2N4275	1272-0016	Fairchild	2N4275
Q3	Fet, N-Channel	1272-0025	Teledyne	2N4092
Q4	Si, PNP, 2N4121	1272-0023	Fairchild	2N4121
Q5	Si, NPN, 2N4275	1272-0016	Fairchild	2N4275
Q6	Fet, N-Channel	1272-0025	Teledyne	2N4092
Q7	Si, PNP, 2N4121	1272-0023	Fairchild	2N4121
Q8	Si, NPN, 2N4275	1272-0016	Fairchild	2N4275
Q9	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q10	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q11	Si, NPN, 2N3567	1272-0014	Fairchild	2N3567





NOTE:
1. RESISTORS – 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS – VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS – VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.

IC NO.	TYPE	TERM. NO.	
		VCC	GND
4	SN7400N	14	7
5,6	SP330A	8	1

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Figure 3-10. Sample and Hold, sheet 1. 2600

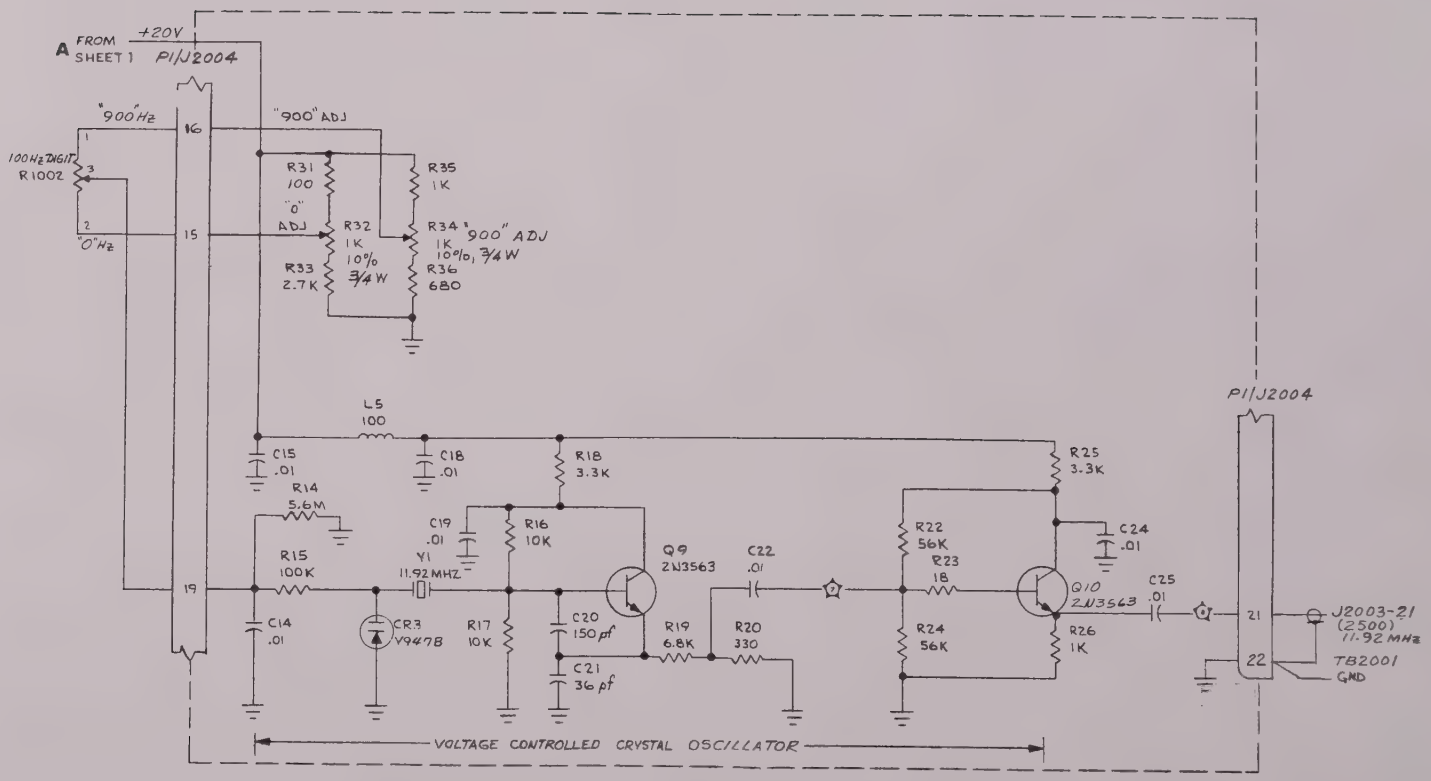

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Figure 3-11. Sample and Hold, sheet 2. 2600

VOLTAGE CONTROLLED OSCILLATOR. 2700

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Voltage Controled Oscillator P.C. Board Assy.	7001-0232	Cushman	
	P.C. Board	1780-0188	Cushman	
	CAPACITORS			
C1	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C2	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C3	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C4	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C5	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C6	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C7	Mica, 5pF, ±.5pF, 500V	1002-0028	Elmenco	DM15-C-050D
C8	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C9	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C10	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C11	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C12	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C13	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C14	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C15	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C16	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C17	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C18	Mica, 10pF, ±5%, 500V	1002-0016	Elmenco	D15-C-100J
C19	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C20	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C21	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C22	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C23	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C24	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C25	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C26	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C27	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C28	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C29	Mica, 15pF, ±5%, 500V	1002-0001	Elmenco	DM15-C-150J
C30	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C31	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C32	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C33	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C34	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C35	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C36	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C37	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C38	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C39	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C40	Mica, 18pF, ±5%, 500V	1002-0014	Elmenco	DM15-C-180J
C41	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C42	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C43	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C44	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C45	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C46	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C47	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C48	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C49	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C50	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J

VOLTAGE CONTROLLED OSCILLATOR (cont). 2700

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
C51	Mica, 22pF, ±5%, 500V	1002-0023	Elmenco	DM15-C-220J
C52	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C53	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C54	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C55	Cer, .0 μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C56	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C57	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C58	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C59	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C60	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C61	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C62	Mica, 27pF, ±5%, 500V	1002-0008	Elmenco	DM15-E-270J
C63	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C64	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C65	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C66	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C67	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C68	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C69	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C70	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C71	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C72	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C73	Mica, 27pF, ±5%, 500V	1002-0008	Elmenco	DM15-E-270J
C74	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C75	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C76	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C77	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C78	Mica, 200pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C79	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C80	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C81	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C82	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C83	Mica, 1000pF, ±5%, 25V	1002-0015	Elmenco	DM15-F-102J
C84	Mica, 39pF, ±5%, 500V	1002-0018	Elmenco	DM15-E-390J
C85	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C86	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C87	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C88	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C89	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C90	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C91	Tant, 10μF, ±10%, 20V	1011-0007	Kemet	K10C20K
C92	Cer, .1μF, ±10%, 100V	1005-0064	Aerovox	CK06BX104K
C93	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C94	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C95	Mica, 33pF, ±5%, 500V	1002-0024	Elmenco	DM15-E-330J
C96	Mica, 36pF, ±5%, 500V	1002-0041	Elmenco	DM15-E-360J
C97	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C98	Mica, 1000pF, ±5%, 100V	1002-0015	Elmenco	DM15-F-102J
C99	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C100	Mica, 220pF, ±5%, 500V	1002-0029	Elmenco	DM15-F-221J
C101	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C102	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C103	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C104	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C105	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z

VOLTAGE CONTROLLED OSCILLATOR (cont). 2700

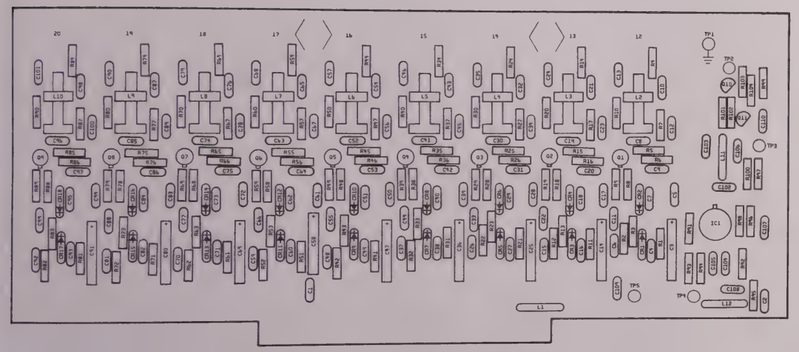
CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
C106	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C107	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C108	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C109	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C110	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
	COILS			
L1	Choke, Molded, 56μH, ±5%	1585-0042	Delevan	1537-64
L2	Variable, 2.8μH, ±5%	1596-0054	Dale	IDH1041-32
L3	Variable, 2.4μH, ±5%	1596-0056	Dale	IDH 1041
L4	Variable, 2.2μH, ±5%	1596-0038	Dale	IDH1041-29
L5	Variable, 1.7μH, ±5%	1596-0046	Dale	IDH1041-28
L6	Variable, 1.4μH, ±5%	1596-0045	Dale	IDH1041-27
L7	Variable, 1.2μH, ±5%	1596-0044	Dale	IDH1041-26
L8	Variable, 1.2μH, ±5%	1596-0044	Dale	IDH1041-26
L9	Variable, 0.9μH, ±5%	1596-0043	Dale	IDH1041-25
L10	Variable, 0.9μH, ±5%	1596-0043	Dale	IDH1041-25
L11	Choke, 2 1/2 turn, Wide Band	1586-0003	VK	20020/413
L12	Choke, 2 1/2 turn, Wide Band	1586-0003	VK	20020/413
	DIODES			
CR1	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR2	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR3	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR4	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR5	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR6	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR7	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR8	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR9	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR10	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR11	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR12	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR13	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR14	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR15	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR16	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR17	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
CR18	Diode, MV1650, 100pF, Varicap	1281-0037	Motorola	MV1650
	INTEGRATED CIRCUITS			
IC1	RF Ampl, CA3028A	2025-0012	RCA	CA3028A
	RESISTORS			
R1	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R2	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R3	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R4	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R5	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R6	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R7	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R8	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R9	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R10	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225

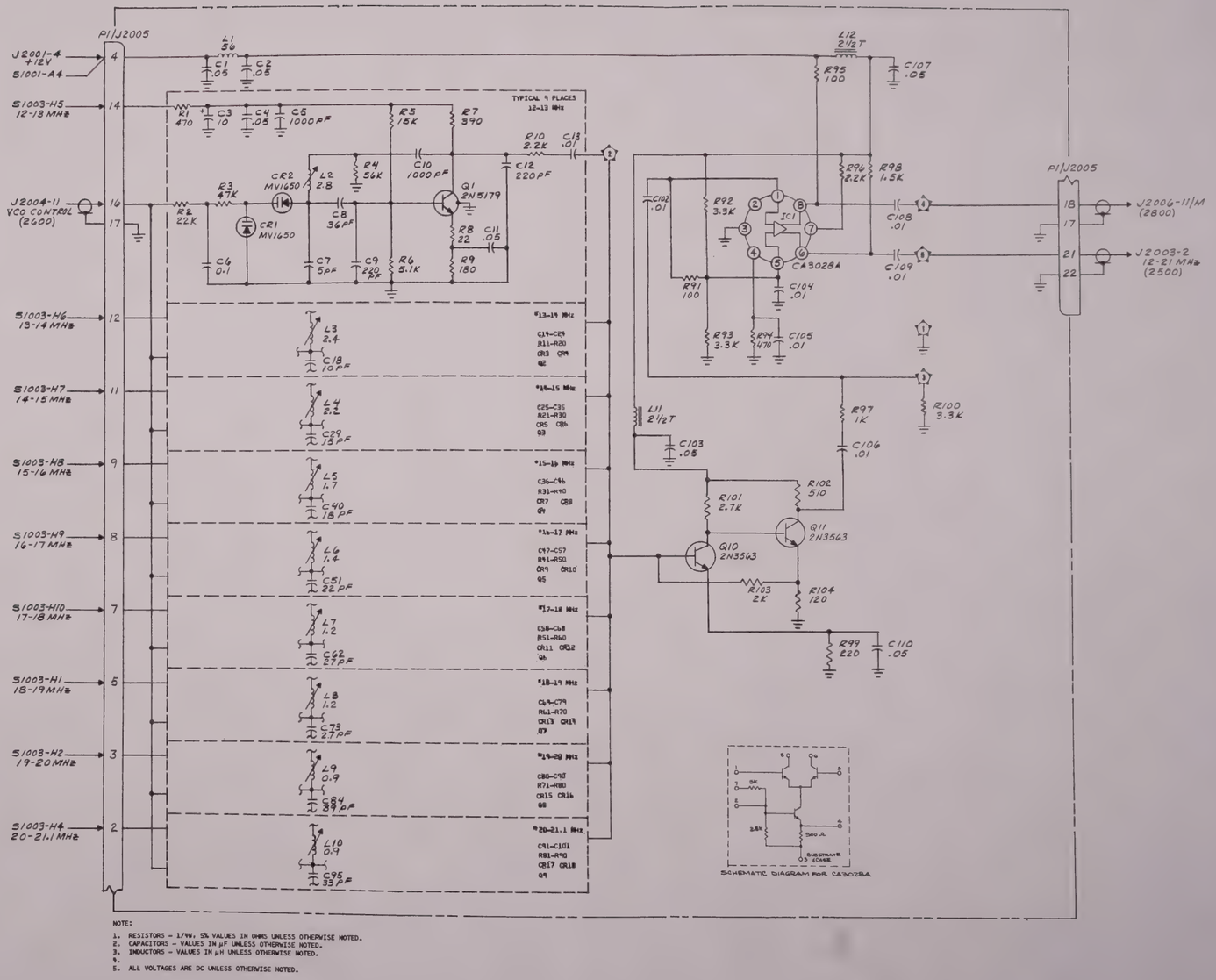
VOLTAGE CONTROLLED OSCILLATOR (cont). 2700

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
R11	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R12	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-B adley	CB2235
R13	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R14	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R15	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R16	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R17	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R18	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R19	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R20	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R21	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R22	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R23	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R24	Comp, 56k, ±5%, 1/4W	1055-5635	Allen-Bradley	CB5635
R25	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R26	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R27	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R28	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R29	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R30	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R31	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R32	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R33	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R34	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R35	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R36	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R37	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R38	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R39	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R40	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R41	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R42	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R43	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R44	Comp, 56K, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R45	Comp, 15K, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R46	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R47	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R48	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R49	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R50	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R51	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R52	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R53	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R54	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R55	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R56	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R57	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R58	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R59	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R60	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R61	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R62	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R63	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R64	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R65	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535

VOLTAGE CONTROLLED OSCILLATOR (cont). 2700

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
R66	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R67	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R68	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R69	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R70	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R71	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R72	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R73	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R74	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R75	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R76	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R77	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R78	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R79	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R80	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R81	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R82	Comp, 22k, ±5%, 1/4W	1066-2235	Allen-Bradley	CB2235
R83	Comp, 47k, ±5%, 1/4W	1066-4735	Allen-Bradley	CB4735
R84	Comp, 56k, ±5%, 1/4W	1066-5635	Allen-Bradley	CB5635
R85	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R86	Comp, 5.1k, ±5%, 1/4W	1066-5125	Allen-Bradley	CB5125
R87	Comp, 390Ω, ±5%, 1/4W	1066-3915	Allen-Bradley	CB3915
R88	Comp, 22Ω, ±5%, 1/4W	1066-2205	Allen-Bradley	CB2205
R89	Comp, 180Ω, ±5%, 1/4W	1066-1815	Allen-Bradley	CB1815
R90	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R91	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R92	Comp, 3.3k, ±5%, 1/4W	1066-3325	Allen-Bradley	CB3325
R93	Comp, 3.3k, ±5%, 1/4W	1066-3325	Allen-Bradley	CB3325
R94	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R95	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R96	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R97	Comp, 1k, 5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R98	Comp, 1.5k, ±5%, 1/4W	1066-1525	Allen-Bradley	CB1525
R99	Comp, 220Ω, ±5%, 1/4W	1066-2215	Allen-Bradley	CB2215
R100	Comp, 3.3k, ±5%, 1/4W	1066-3325	Allen-Bradley	CB3325
R101	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R102	Comp, 510Ω, ±5%, 1/4W	1066-5115	Allen-Bradley	CB5115
R103	Comp, 2k, ±5%, 1/4W	1066-2025	Allen-Bradley	CB2025
R104	Comp, 120Ω, ±5%, 1/4W	1066-1215	Allen-Bradley	CB1215
	TRANSISTORS			
Q1	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q2	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q3	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q4	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q5	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q6	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q7	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q8	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q9	Si, NPN, 2N5179	1272-0060	Motorola	2N5179
Q10	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q11	Si, NPN, 2N5179	1272-0060	Motorola	2N5179





5601**0048

Figure 3-12. Voltage Controlled Oscillator. 2700

DIVIDE BY N. 2800

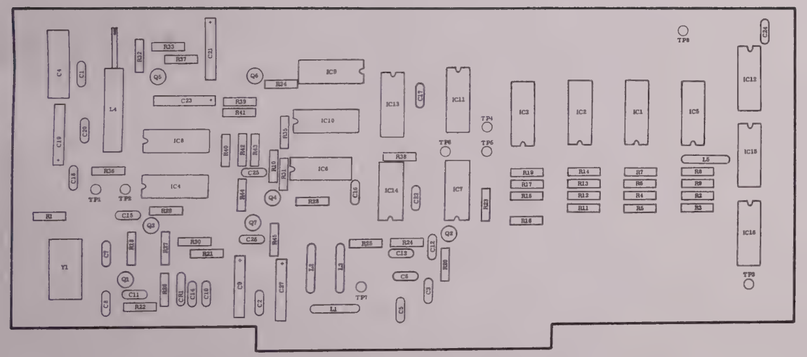
CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Divide By N			
	P.C. Board Assy	7001-0088	Cushman	
	P.C. Board	1780-0185	Cushman	
	CAPACITORS			
C1	Mica, 27pF, ±5%, 500V	1002-0008	Elmenco	DM15-E-270J
C2	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C3	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C4	Var, 0.8-12pF, 750V	1001-0007	JFD	VC-31 GWY
C5	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C6	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C7	Mica, 300pF, ±5%, 500V	1002-0032	Elmenco	DM15-F-331J
C8	Mica, 1000pF, ±5%, 500V	1002-0015	Elmenco	DM15-F-102J
C9	Elect, 15μF, +75% -10%, 12V	1013-0015	Sprague	30D156G012BA5
C10	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C11	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C12	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C13	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C14	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C15	Cer, .05μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C16	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C17	Cer, .01μF, +80% -20%, 25V	1005-0013	Erie	5835-512-Y5U-103Z
C18	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C19	Elect, 1μF, ±10%, 25V	1013-0004	Sprague	30D105G025BA5
C20	Mica, 3900pF, ±5%, 500V	1002-0079	Elmenco	DM19-F-392J
C21	Elect, 1μF ±10%, 25V	1013-0004	Sprague	30D105G025BA5
C22	Poly, .01μF, ±10%, 200V	1008-0043	Sprague	225P10392XA3
C23	Elect, 1μF, ±10%, 25V	1013-0004	Sprague	30D105G025BA5
C24	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C25	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C26	Cer, .05μF, +80% -20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
C27	Elect, 1μF, ±10%, 25V	1013-0004	Sprague	30D105G025BA5
	COILS			
L1	RF Choke, 47μH, ±5%	1585-0010	Delevan	1537-60
L2	Choke, 2 1/2 turns, Wide Band	1586-0003	VK	20020/4B
L3	RF Choke, 47μH, ±5%	1585-0010	Delevan	1537-60
L4	Molded Var, .570-1.25mH	1596-0033	Delevan	4000-42
L5	RF Choke, 12μH, ±10%	1585-0011	Delevan	1537-38
	CRYSTAL			
Y1	Crystal, 2.000 MHz	2035-0008	Cushman	
	DIODES			
CR1	Zener, 6.8V, ±20%, 1N957	1281-0007	Motorola	1N957
	INTEGRATED CIRCUITS			
IC1	I.C., SN74196N	2025-0016	TI.I	SN74196B
IC2	I.C., SN74196N	2025-0016	TI.I	SN74196B
IC3	I.C., SN74196N	2025-0016	TI.I	SN74196B
IC4	TTL Decade Counter	2025-0002	T.I.	SN7490N
IC5	I.C., SN74196N	2025-0016	TI.I.	SN74196B

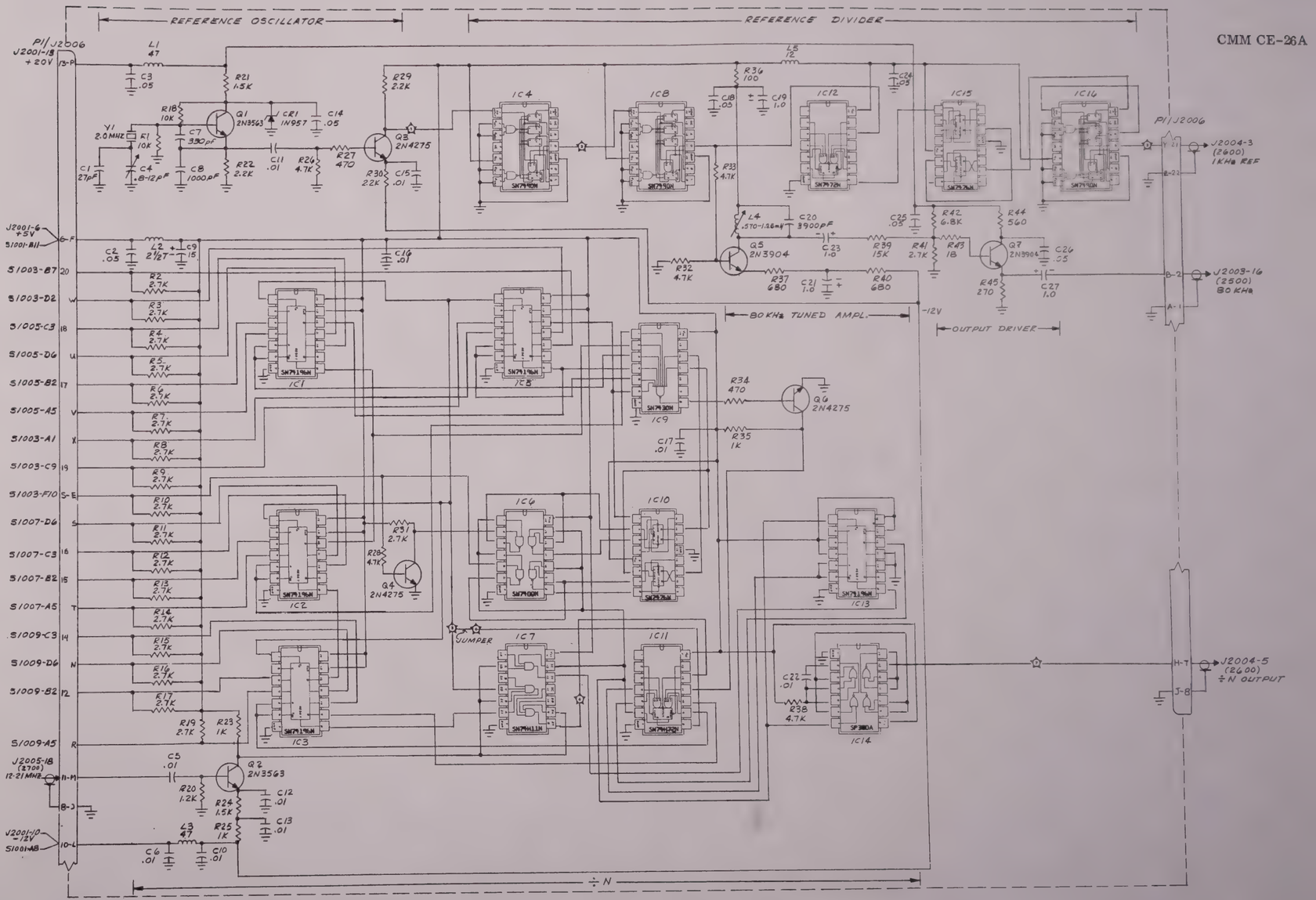
DIVIDE BY N (cont). 2800

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
IC6	TTL NAND Gate	2025-0003	T.I.	SN7400N
IC7	TTL And Gate	2025-0017	T.I.	SN74H11N
IC8	TTL Decade Counter	2025-0002	T.I.	SN7490N
IC9	TTL Single Gate	2025-0004	T.I.	SN7430N
IC10	TTL Dual Flip-Flop	2025-0005	T.I.	SN7476N
IC11	TTL Dual Flip-Flop	2025-0023	T.I.	SN74H72N
IC12	TTL Dual Flip-Flop	2025-0023	T.I.	SN74H72N
IC13	I.C., SN74196N	2025-0016	TI.I	SN74196B
IC14	Quad, 2-input Nor.	2025-0019	Signetics	SP380A
IC15	TTL Dual Flip-Flop	2025-0005	T.I.	SN7476N
IC16	TTL Decade Counter	2025-0002	T.I.	SN7490N
	RESISTORS			
R1	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R2	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R3	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R4	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R5	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R6	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R7	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R8	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R9	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R10	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R11	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R12	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R13	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R14	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R15	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R16	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R17	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R18	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R19	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R20	Comp, 1.2k, ±5%, 1/4W	1066-1225	Allen-Bradley	CB1225
R21	Comp, 1.5k, ±5%, 1/4W	1066-1525	Allen-Bradley	CB1525
R22	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R23	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R24	Comp, 1.5k, ±5%, 1/4W	1066-1525	Allen-Bradley	CB1525
R25	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R26	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R27	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R28	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R29	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R30	Comp, 2.2k, ±5%, 1/4W	1066-2225	Allen-Bradley	CB2225
R31	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R32	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R33	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R34	Comp, 470Ω, ±5%, 1/4W	1066-4715	Allen-Bradley	CB4715
R35	Comp, 1k, ±5%, 1/4W	1066-1025	Allen-Bradley	CB1025
R36	Comp, 100Ω, ±5%, 1/4W	1066-1015	Allen-Bradley	CB1015
R37	Comp, 680Ω, ±5%, 1/4W	1066-6815	Allen-Bradley	CB6815
R38	Comp, 4.7k, ±5%, 1/4W	1066-4725	Allen-Bradley	CB4725
R39	Comp, 15k, ±5%, 1/4W	1066-1535	Allen-Bradley	CB1535
R40	Comp, 680Ω, ±5%, 1/4W	1066-6815	Allen-Bradley	CB6815
R41	Comp, 2.7k, ±5%, 1/4W	1066-2725	Allen-Bradley	CB2725
R42	Comp, 6.8k, ±5%, 1/4W	1066-6825	Allen-Bradley	CB6825
R43	Comp, 18Ω, ±5%, 1/4W	1066-1805	Allen-Bradley	CB1805
R44	Comp, 560Ω, ±5%, 1/4W	1066-5615	Allen-Bradley	CB5615
R45	Comp, 270Ω, ±5%, 1/4W	1066-2715	Allen-Bradley	CB2715

DIVIDE BY N (cont). 2800

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	TRANSISTORS			
Q1	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q2	Si, NPN, 2N3563	1272-0022	Fairchild	2N3563
Q3	Si, NPN, 2N4275	1272-0016	Fairchild	2N4275
Q4	Si, NPN, 2N4275	1272-0016	Fairchild	2N4275
Q5	Si, NPN, 2N3904	1272-0032	Motorola	2N3904
Q6	Si, PNP, 2N4275	1272-0016	Fairchild	2N4275
Q7	Si, NPN, 2N3904	1272-0032	Motorola	2N3904





NOTE:

1. RESISTORS - 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.

Figure 3-13. Divide by N. 2800

REAR PANEL. 3000

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Assembly, Rear Panel	7003-0072	Cushman	
	Panel, Rear	2800-0087	Cushman	
	FUSEHOLDER			
XF1	3AG, Bayonet Knob	1965-0001	Littlefuse	342012
	FUSE			
F1	Slo-Blo, 1 Amp, 3AG	1955-0006	Littlefuse	3AG-313001
	JACKS			
J1	Not Used			
J2	3-Wire, AC Receptacle	2535-0025	H.H. Smith	1280-103
J3	BNC, Rear Mtg.	2536-0034	Kings	KC-79-143
J4	BNC, Rear Mtg.	2536-0034	Kings	KC-79-143
	SWITCH			
S1	Slide, 115/230V	1850-0012	Switchcraft	46256LFR
	TERMINAL BOARDS			
TB1	Not Used			
TB2	Lug, #6	3766-0001	Federal	1902
TB3	Lug, 3/8" I.D.	3766-0011	Switchcraft	P1094-5
TB4	Lug, 3/8" I.D.	3766-0011	Switchcraft	P1094-5

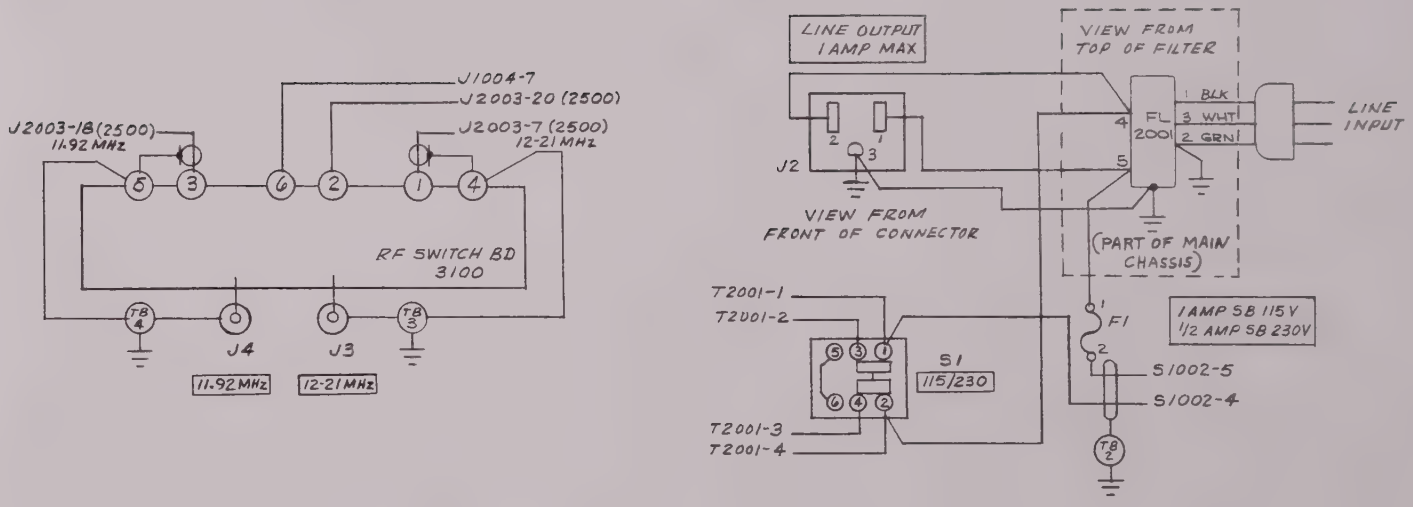
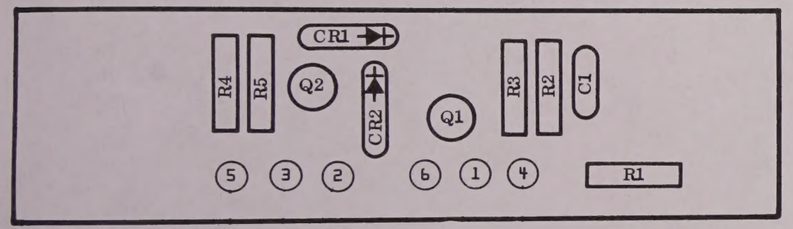
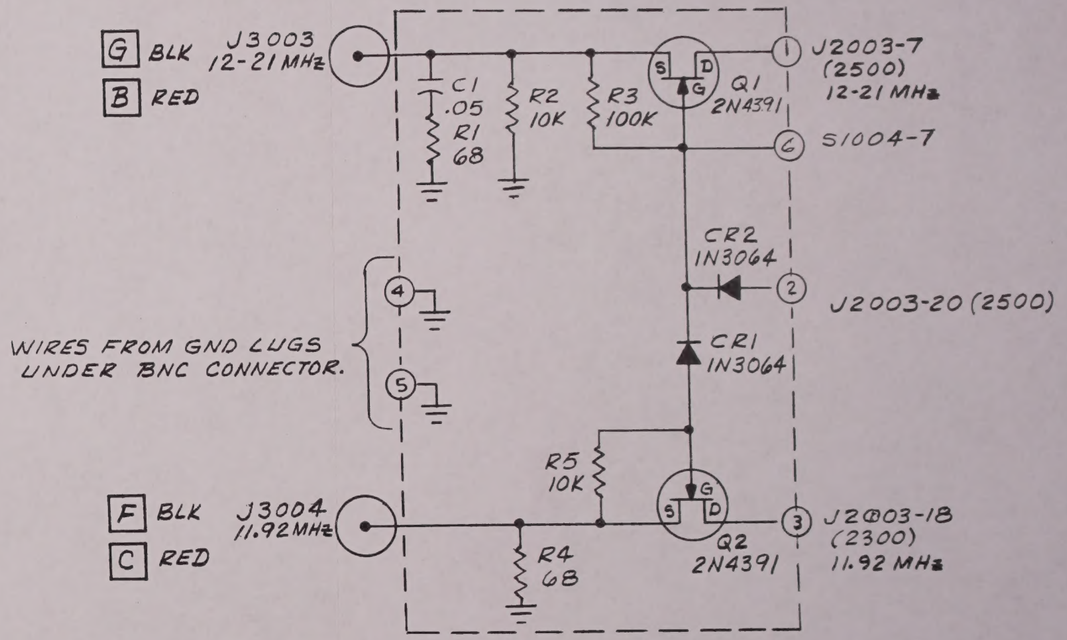


Figure 3-14.
Rear Panel Interconnection Diagram. 3000

RF SWITCH. 3100

CKT. REF.	DESCRIPTION	CE STOCK NO.	MFR.	MFR. NO.
	Board Assy., RF Switch	7001-0089	Cushman	
	P.C. Board	1780-0187	Cushman	
	CAPACITOR			
C1	Cer, .05μF, +80-20%, 25V	1005-0014	Erie	5855-505-Y5U0-503Z
	DIODES			
CR1	Si, High-Speed	1281-0013	Transitron	1N3064
CR2	Si, High-Speed	1281-0013	Transitron	1N3064
	RESISTORS			
R1	Comp, 68Ω, ±5%, 1/4W	1066-6805	Allen-Bradley	CB6805
R2	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
R3	Comp, 100k, ±5%, 1/4W	1066-1045	Allen-Bradley	CB1045
R4	Comp, 68Ω, ±5%, 1/4W	1066-6805	Allen-Bradley	CB6805
R5	Comp, 10k, ±5%, 1/4W	1066-1035	Allen-Bradley	CB1035
	TRANSISTORS			
Q1	FET, N-Channel	1272-0042	Teledyne	2N4391
Q2	FET, N-Channel	1272-0042	Teledyne	2N4391



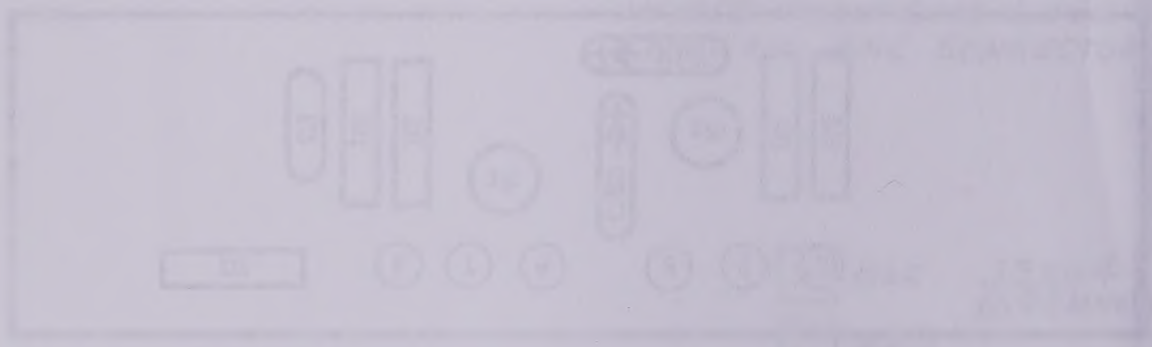


NOTE:

1. RESISTORS - 1/4W, 5% VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITORS - VALUES IN μF UNLESS OTHERWISE NOTED.
3. INDUCTORS - VALUES IN μH UNLESS OTHERWISE NOTED.
4. *FACTORY SELECT. TYPICAL VALUE SHOWN.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED.
6. J3001 AND J3002 ARE CONNECTORS WITH BNC GROUND LUG. BOTH SIGNAL AND SHIELD LEADS ARE TO BE KEPT AS SHORT AS POSSIBLE.

5601**0048

Figure 3-15. RF Switch. 3100



MP MASTER
MA31787